

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 71: No. 14.

New York, Thursday, April 2, 1903.

\$5.00 a Year, including Postage
Single Copies, Ten Cents.

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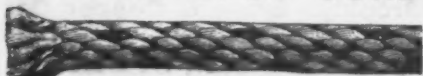


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CAHALL BOILERS See Page 156.



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PAGE 28.



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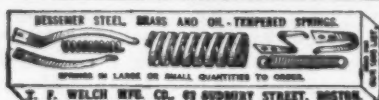
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THE IRON AGE

THURSDAY, APRIL 2, 1903.

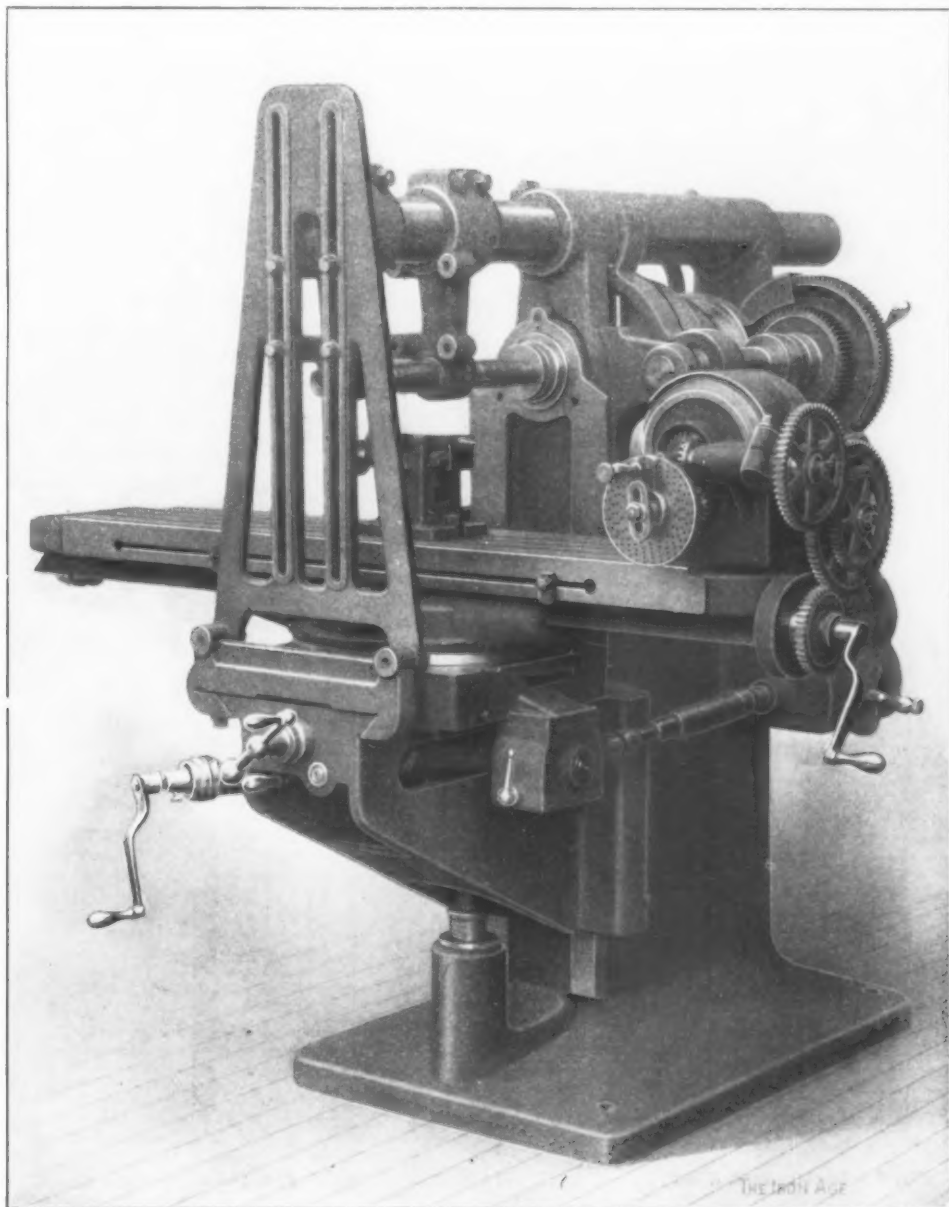
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The New Le Blond Milling Machine.

The line of milling machines built by the R. K. Le Blond Machine Tool Company of Cincinnati, Ohio, was completely redesigned last fall, special care having been exercised to enable the tools to produce the maximum amount of work. They can be adjusted, operated

speeds. These speeds are arranged in geometrical ratio, the same amount of increase being obtained from the belts to back gear speeds as from one to another belt speed. These speeds are obtained by driving cones of large diameter and wide face, the Nos. 0 and 1 having plain cone, Nos. 1½ and 2 being back geared and Nos. 3 and 5 being double friction back geared.

The first engraving shows the No. 3 universal ma-



No. 3 Universal Milling Machine.

THE NEW LE BLOND MILLING MACHINE.

and locked from practically one position. They have a wide range of speed and feed changes; the driving cones are of large diameter for wide belts; the spindles are strongly back geared and the feeds are powerful. All sliding surfaces are scraped to surface plates and cylindrical surfaces finished by grinding. The bevel gears are planed theoretically correct and interchangeability is secured by making all parts to standard jigs.

The Nos. 0 and 1 machines have eight spindle speeds; Nos. 1½ and 2, 12 spindle speeds, and Nos. 3 and 5, 18

chine, the principal novelty of which is the double friction back gears, the construction of which is illustrated in Fig. 2. This back gear consists of a ring, C, which is opened by a plug, D, the sides of which are made tapering. The plug is forced up with a taper key, E. The friction ring is made to snap tight on a spool so that when released there is absolutely no friction on the gear, as the band comes tightly to its place on the spool. The wedge or key is carried by a yoke, F, which turn is operated by the lever G, shown at the side of the

column. The special advantage of making the friction this way is that it is multiplied a good many times before it reaches the spindle, as this friction merely drives the pinion on the back gear quill, which in turn drives the face gear, making it several times as powerful as a friction direct in the face gear. This construction provides ample driving power.

The advantages of these back gears are that they can be properly proportioned; a greater number of spindle

12½ to 262 revolutions per minute. The large step of the spindle and countershaft cones is the same in both. The countershaft on the double geared machine runs at 180 and 220 revolutions per minute, while that on the single geared machine runs at 135 and 166 revolutions per minute, giving the double geared machine a gain in countershaft speed or power of 33 and 30 per cent. respectively. The cone diameters on the double back geared machine are 13, 10½ and 8½ inches. On the

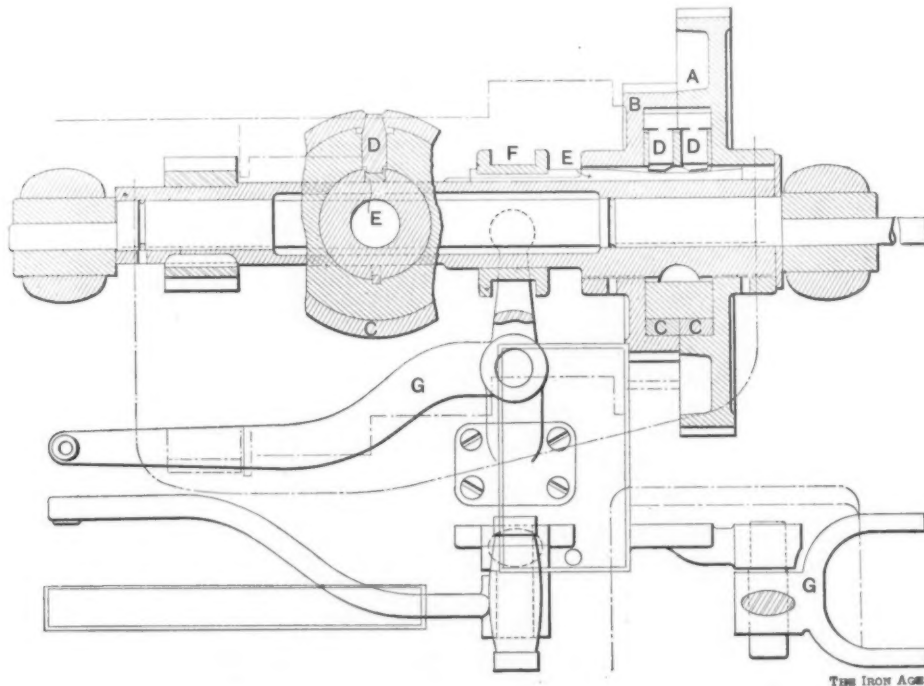


Fig. 2.—Details of Double Friction Back Gear.

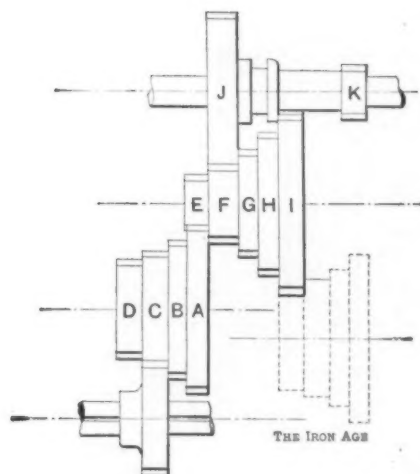


Fig. 3.—Double Back Gear.

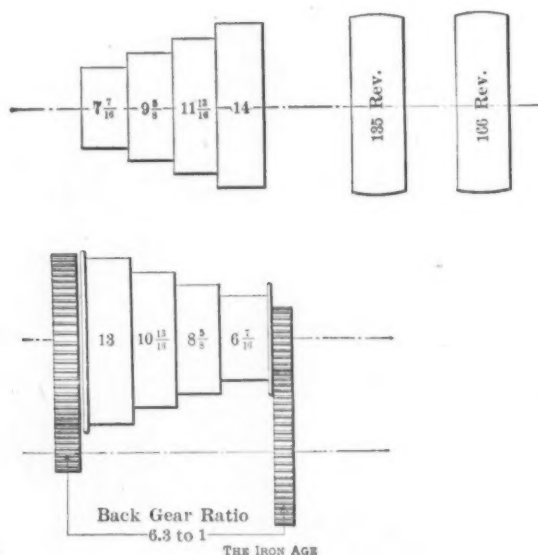


Fig. 4.—Single Back Gear.

THE NEW LE BLOND MILLING MACHINE.

speeds can be obtained, as four changes of speed are derived without shifting a belt; there is a higher ratio of back gears and higher belt speeds and therefore better belt contact; finally, the drive is twice as powerful as on the regular single back geared machine.

A comparison of the relative spindle power of a double back geared machine with that obtained by an ordinary four-step cone and single back gear, conditions being the same in both instances, shows the superiority of the former. Fig. 3 is a diagram of a double back gear and Fig. 4 of a single back gear drive, both being calculated to give the same range of spindle speeds, from

single back geared machine they are 13, 10 13/16, 8½ and 6 7/16 inches in diameter. This gives an increased diameter on the smallest cone step of the double back geared machine of 2½ inches, amounting to 32 per cent. increased belt contact. This pertains as well to the small step of the countershaft cone.

The relative belt speeds obtained are shown graphically in the diagram, Fig. 5. The broken line indicates those on the single geared and the solid line those on the double geared machine. It will be seen that when both machines are running at the slowest speed of 12½ revolutions per minute the double back geared machine

has a cone belt velocity of 447 feet per minute, while the single back geared machine has a velocity of 267 feet per minute, showing a gain for the double back geared machine of 70 per cent. in power. This proportion is maintained until a speed of 35 revolutions per minute is reached, when engaging the low ratio of back gear the double back geared machine reduces the belt speed to about that of the single geared machine, from which point the belt speed then increases in favor of the double back geared machine until at 75 revolutions per minute there is a difference in the belt speed of 390 feet, or a

12½ revolutions per minute the double back gear would have a belt travel of 35 feet per revolution, the single back gear 22 feet per revolution, or a gain in belt travel of 13 feet per revolution. The power is proportioned to the relative belt velocity. On the high speeds, where the back gear is not used, there is a gain of about 32 per cent. Each back gear increases the pulling power of the cutter until on the slowest speed there is an increased cutting power of 62 per cent.

Next in importance is the novelty of the feed change box, Figs. 7 and 8. The feeds are arranged in geo-

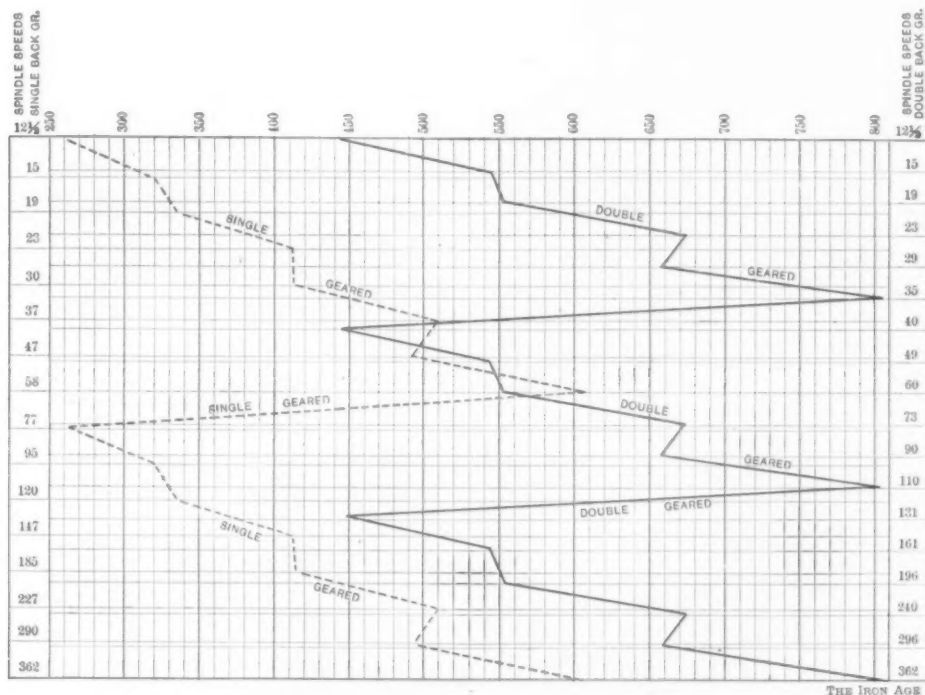


Fig. 5.—Diagram Showing Relative Belt Velocity in Feet Per Minute.

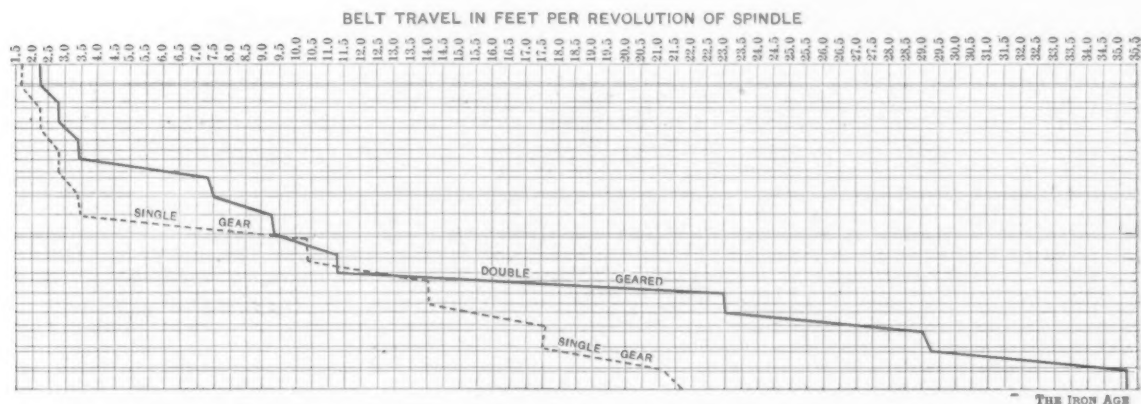


Fig. 6.—Diagram Showing the Relative Pull on the Cutter of the Single and Double Back Geared Machines.

THE NEW LE BLOND MILLING MACHINE.

gain of 150 per cent. When the machines are running on the open belt the double back geared machine has an increased belt speed varying from 70 to 200 feet, as will be seen from the diagram.

There is still another factor to consider that has an important bearing on the power of the machine—namely, the ratio of the back gears. Calculating the back gear ratio so as to give an even grade of speeds running in geometrical progression from 12½ to 362 revolutions per minute, we get a back gear ratio of 3.31 and 10.34 on the double back geared machine and 6.2 on the single back geared machine, amounting to an average increase of 74 per cent. in back gear power in favor of the double back geared machine. The diagram, Fig. 6, demonstrates this by showing the belt travel per revolution of the spindle. For example, with a spindle speed of

metrical progression, ranging from 0.006 to 0.255 per revolution of the spindle. The box is composed strictly of spur gears, and the transmission from the spindle to the box is through spur gear. Any feed can be instantly obtained by the movement of a single lever. An engraved plate attached to the feed box indicates the feed obtained. The lower lever gives a fine and the upper lever a coarse graduation of feed. Each handle is entirely independent of the other and can be worked separately or in unison.

To illustrate this suppose the operator was using a feed of 0.012 to one revolution of the spindle and wanted to get 0.02. The lower lever would then be moved two notches. If 0.086 was required the upper lever would be shifted. With the upper lever in the first position all the feeds from 0.006 to 0.036 would be obtained, or

the range generally used for direct cone drive. With the upper lever in the second position all the feeds from 0.043 to 0.255 would be had, or the feeds used when the spindle is back geared.

The spindle on the feed box is inversely proportioned to the spindle speeds, obviating speeds that are detri-

gears on the upper cone with the gear A on the lower cone, eight changes of speed are obtained. By moving the gear K into mesh with the gear I eight more changes are obtained.

The No. 3 universal machine, Fig. 1, has an automatic traverse of 10 inches, a vertical movement of $18\frac{1}{2}$

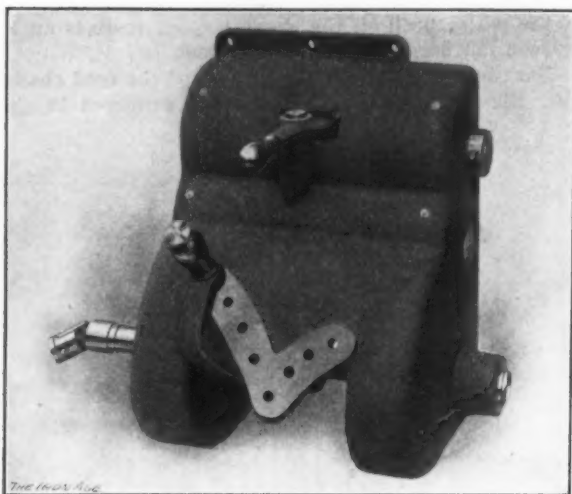


Fig. 7.—Feed Box.

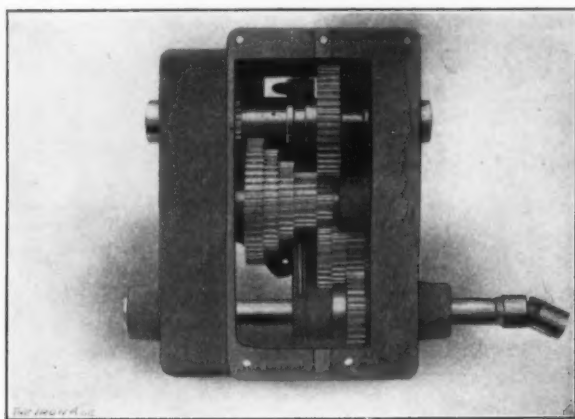


Fig. 8.—Cover Removed.

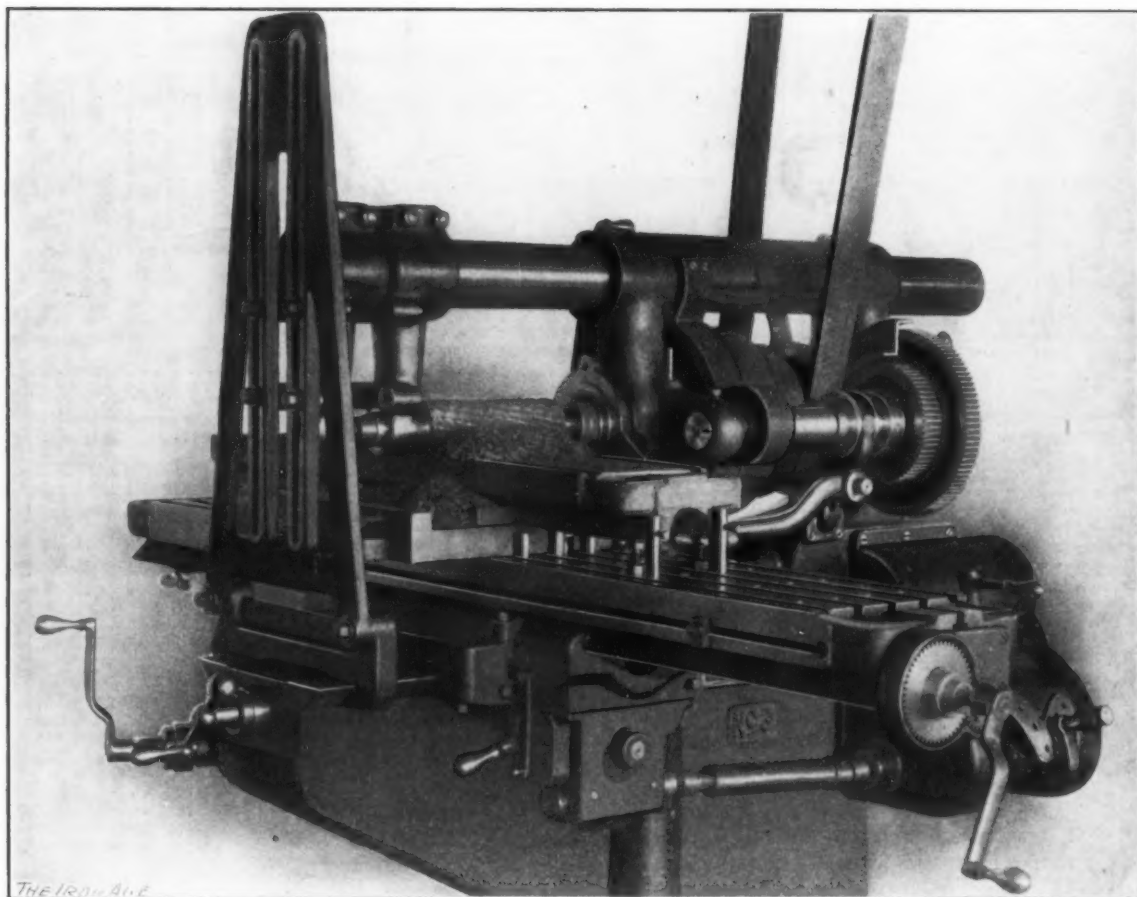


Fig. 9.—No. 3 Plain Machine.

THE NEW LE BLOND MILLING MACHINE.

mental to the machine. On the high spindle speeds and high feeds the drive is through the pinion K, Fig. 3. On slow speeds when heavy cuts are taken the feed is through the gear J, increasing the feed and power of the feed box seven times.

The levers on the feed box are nearest the operator. By meshing each of the gears on the lower cone with the gear I on the upper cone, Fig. 3, and each of the

inches and an automatic longitudinal movement of 36 inches. All the movements are graduated. The table has a working surface of 12 x 53 inches. It can be swiveled 45 degrees each way for cutting spirals. The spiral head swings 12 inches, and takes 34 inches between centers. The spindle can be turned completely over from one side to the other, and is threaded and bored to the same taper as the main spindle. The over-

hanging arm is a solid bar of steel furnished with two supports.

The plain machine, No. 3, Fig. 9, has a traverse of $10\frac{1}{2}$ inches, a vertical movement of 20 inches and a longitudinal movement of 36 inches. The table is the same size as the other, and has an automatic feed in both directions of 36 inches.

Notes from Great Britain.

The Markets.

LONDON, March 21, 1903.—We are having quite a lively time, for during the week there has been a good deal of speculative buying, with the result that prices have been irregular. The prevailing feature is the continued firmness of pig iron. Smelters are now well supplied with contracts. Consumers have again taken heart of grace. Forge iron quotations have advanced. The increased cost of spelter has brought up galvanized sheets to £11 10s., f.o.b. Liverpool. Black sheets have also advanced, and altogether the market prices of raw materials and semifinished products are stiffer. Copper has been irregular all the week, but finished up last night at £66 10s. Reports from America arouse some distrust, and consumers are buying for immediate requirements, the rest of the market activity being purely speculative. Tin has been bobbing up and down, settlement price last night being £134 5s. It is thought that the account on the whole has been considerably oversold. Prices to-day are as follows:

Pig Iron: Scotch, 57 shillings 4 pence; Middlesbrough, 52 shillings 7 pence; hematite, 61 shillings 6 pence. Forge qualities: Staffordshire cinder, 48 shillings 6 pence; part-mine, 49 to 51 shillings; all-mine, 57 shillings 6 pence to 67 shillings 6 pence; best ditto, 80 to 85 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 48 shillings 6 pence to 50 shillings; Derbyshire, 51 to 52 shillings; North Staffordshire, 51 to 52 shillings; Lincolnshire, 53 shillings 1 penny.

	Friday, March 20.	Thursday, March 19.
Public stores stocks, in tons.		
Connell's, at Glasgow.....	19,798	19,798
Connell's, at Middlesbrough, hematite.....	1,300	1,300
	Thursday, Wednesday, March 19.	March 18.
Hematite.		
West Coast.....	22,488	22,488
Connell's, at Middlesbrough.....	130,568	132,041

Finished Iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 5s. to £6 10s.; North Staffordshire bars, £6 15s.; angles, £6 10s. to £7; sheets, singles, £7 12s. 6d. to £7 17s. 6d., doubles, £7 15s. to £8, trebles, £8 7s. 6d. to £8 12s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 10s. to £11 15s.; hoop iron, £7 5s. to £7 10s.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £6 12s. 6d. to £6 15s.

Steel: Bessemer billets, £4 15s. to £4 17s. 6d.; Siemens billets, £4 17s. 6d. to £5; mild steel bars, £6 12s. 6d. to £7 2s. 6d.; steel plates, £6 5s. to £7; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 7s. 6d.

It is noticeable that the Middlesbrough warrants have touched a level not reached since October 1 last.

Wages and the State of Trade.

A conference has been held during the week between the engineering employers' federation and the Amalgamated Society of Engineers. After two days' sitting, a reduction of wages on the Northeast Coast of 1 shilling per week time rates and $2\frac{1}{2}$ per cent. piece work rates, to take effect on May 1, was agreed to. Considerable discussion took place with regard to the proposal on the part of the employers to reduce wages on the Clyde by 1 shilling time rates and 5 per cent. piece work rates. On this point the conference was unable to come to an agreement.

Profits and Dividends.

The balance sheet of Charles Cammell & Co. for last year records a net profit of £144,724, and a dividend of 5 per cent. for the year on the preference shares and 10 per cent. on the ordinary shares is declared. A number of interesting points in the report are worth noting by American readers. I glean the following facts:

The resumption of work in the heavy branches of the company's business did not occur until too late in the year to make good the consequences of the lack of employment in the early part, and it is due to this circumstance, in combination with the lower prices obtainable for other materials, that the reduction in profits as compared with the previous year is to be attributed.

In reference to the mines in Spain, in which the company are interested, the construction of that portion of the independent line of railway over which the mineral will be carried to Bilbao has been placed with a well-known firm of contractors in England. An advantageous arrangement has been made by the Sierra Company for the conveyance of the mineral over the railway when partially or wholly completed. The development of an important deposit of ore lying between Bezares and Huerta de Abajo is being actively carried on, and this deposit will be available as soon as the means of sufficiently economical communication are established. If the promise of the explorations already made be realized there will be sufficient mineral here for several years' consumption of the Cumberland blast furnaces without recourse to other portions of the properties.

The acute depression which has for some time prevailed in the manufacturing districts of Russia has prevented the Russian Cammell Fire Company, Limited, from contributing anything to the profits of the parent company this year. The sales of files, however, are steadily increasing, and a more profitable result is expected when improvement occurs in the economic condition of Southern Russia.

The profit made last year by A. J. Stewart & Menzies, Limited, the well-known tube manufacturers, was £150,336, gross, and £97,132, net, and a dividend of 10 per cent. is declared. This company amalgamated as from January 1 with the other well-known tube manufacturing firm of Lloyd & Lloyd, but the joint working, of course, does not come into last year's working balance sheet. The capital of the new company reaches altogether £1,750,000.

Standardization of Gun Manufacture.

Upon the important question of the standardization of gun manufacture, the following words from the speech of the Secretary to the Admiralty in the House of Commons should be placed on record, for they may have far reaching effect:

"With regard to guns, everybody connected with these naval matters realizes that the question of the efficiency of a gun is very important. There are two things which have to be considered: 1. The total gun power of the ships, which becomes more important in these days of improved armor and improved torpedoes; 2, the actual efficiency of a gun, which is measured by its muzzle velocity and striking power.

"The attention of the Admiralty has often been directed to these points, but it has never been an easy matter to revolutionize the whole gunnery equipment of our fleet, but I can say there has been a steady, progressive increase in the effective gun power of our ships. We believe the new guns which are being fitted into the ships under construction will be an immense advance on those we have already, which will be partly due to the increased efficacy of the powder we use, and partly due to the length of the gun.

"I also wish to make reference to a fact which will have the effect of increasing the rapidity of construction, and it is the standardization of our work. This question has been dealt with by some of the most powerful engineering committees this country has ever known, which have met under the presidency of Sir James Wolf, Bart., on which committees have sat representatives of our Government departments. The committees are only commencing the production of their labors, the first of their volumes being that on standardization. Anything which tends toward the supply of proper material must be important to the Admiralty. Up to last year, 12-inch guns, costing £30,000 each, were manufactured by three great makers, the differences being of a minute character. We have now got those makers together in a room, and they have agreed to make every part of the guns interchangeable. In future, therefore, throughout the world, wherever a part—be it large or small—requires to be replaced, we shall be able to replace it from our own stores, independently of the maker."

In this regard I may say that I had the other day a question of providing gun mountings for a small gun.

S. G. H.

Extra Session of Congress in November.

WASHINGTON, D. C., March 31, 1903.—The cablegram of Secretary Hay to United States Minister Squiers at Havana to the effect that President Roosevelt will call an extra session of Congress next fall, which promptly brought about the ratification by the Cuban Senate of the pending reciprocity treaty on March 28, has been followed by a semiofficial statement to the effect that Congress will be called together on November 9, four weeks in advance of the regular date of meeting. The President's object is to secure the approval of the treaty by both houses before the holiday recess, and he expects that the efforts of the Congressional leaders will be concentrated upon this one item of legislation and that until it is disposed of—or at least until December 7, the regular date of meeting—no attention will be devoted to other matters.

Until within a few days the majority leaders in both House and Senate had strongly advised the President not to call an extra session to consider the Cuban treaty. The months of October and November cover the period during which much work preliminary to the Presidential conventions is done by the political leaders of both parties, and this time is very valuable to Senators and Representatives who are necessarily detained in Washington through the coming long session. After mature reflection, however, Senator Allison and several of his colleagues on the Senate Finance Committee decided to recommend the early convening of Congress in the hope of disposing of all questions associated with the tariff as far as possible in advance of the meeting of the national conventions. Senator Allison presented the case to the President with considerable force, and it was thereupon decided to bring Congress together immediately after the State and municipal elections, which take place this year on November 3.

A Tariff Wrangle Expected.

The majority leaders in both houses are making no attempt to conceal the fact that the consideration of the Cuban treaty will provoke a protracted wrangle over the tariff, which they greatly deprecate, but which cannot well be avoided. The hope has been entertained that extended debate might be limited to the Senate, but recent developments indicate that the question at issue will probably not be so promptly disposed of by the House as has been predicted. So many Republican Representatives will enter the new Congress pledged to secure certain tariff reductions that the fight in the House promises to be even more interesting than in the Senate.

It is assumed that immediately after the election of Representative Cannon as Speaker of the House in the Fifty-eighth Congress the personnel of the Ways and Means Committee will be announced, and a joint resolution putting into force the reduced rates of the Cuban treaty will be speedily reported. If it is then possible to pass a resolution after limited debate, under a special order from the Committee on Rules, there will be little or no delay in the House, but the crucial test will be whether the House will agree to consider the resolution under the terms of a special order, which will, of course, cut off amendments, limit debate and fix the time for a vote.

It will be remembered that when the Cuban Reciprocity bill was taken up in the House a year ago the leaders promptly recognized the fact that a majority of the House would oppose the consideration of the measure under an order prohibiting amendments, and it was therefore discussed without limit and so materially amended that the Senate subsequently abandoned it. While there has since been some change of sentiment among members of the House with regard to the question of reciprocity with Cuba and several who opposed the bill a year ago would probably now vote for a resolution putting the treaty into force, there are others who, while favoring the treaty, are now disposed to demand that the joint resolution shall be amended so as to provide also for other and important reductions in the

tariff. The Democratic minority will vote solidly against a special order limiting debate, and if 16 Republicans unite with them they will not only be able to reject the special order, but also to overrule the chair in case the Speaker should hold general tariff amendments not to be germane to the measure under discussion. Under the parliamentary precedents which have been quoted in this connection general tariff amendments may or may not be germane to a joint resolution putting into force the reduced rates of the Cuban treaty, but the question is shrouded in sufficient doubt to make it extremely probable that the Speaker will hold that all amendments are out of order, while members of the House who favor tariff changes will not be deterred by conscientious scruples from voting to overrule the chair.

The element on the Republican side of the House which is likely to prove troublesome to the majority leaders will embrace, 1, the so-called beet sugar members, who will oppose the joint resolution on its merits; 2, members from the Middle West who have been instructed by their constituents to insist upon lower duties on certain schedules of the tariff; and, 3, certain members from New England and New York who are pledged to miss no opportunity to vote for free hides. It is, of course, quite possible that the aggregate of these "insurgent" Representatives will exceed 15 and in that case the tariff fight in the House will be unlimited and full of significance.

But whatever may be the outcome in the House, a memorable tariff discussion in the Senate is inevitable. Such a discussion was planned by the minority leaders of the Senate when the Cuban treaty was amended so as to require it to be "approved by Congress." The tariff and the trusts, and especially the extent to which the tariff has helped the trusts, will be the leading issues put forward by the minority leaders in the next Presidential campaign, the literature of which will be chiefly produced during the debate upon the Cuban resolution. The large Republican majority in the Senate—where the vote now stands 57 to 33, a margin of 24—is counted upon to prevent the passage of any tariff measures except the unamended Cuban resolution, but should a sufficient number of insurgent Republicans vote to amend the resolution a long and bitter contest between the Senate and House would result, of which one outcome would probably be the failure of the Cuban treaty.

No More Reciprocity Treaties.

Whether the Cuban treaty is ratified or not, it is generally accepted without any question that no serious attempt will be made hereafter to ratify any of the other pending treaties, and that Section 4 of the Dingley act, under which they were negotiated, has utterly failed of its purpose. As heretofore stated in these dispatches, the administration will negotiate no more treaties under the existing law, and it is improbable that those now pending will be extended. It has thus been clearly demonstrated that it is impracticable to secure the ratification of a reciprocity treaty which, under the law, must be acted upon by Congress after its negotiation, and this fact has drawn attention anew to the plan, which President McKinley is known to have seriously considered, of adopting the European system of a maximum and minimum tariff.

Under such a system the present rates might be adopted by Congress as a general tariff and a series of minimum conventional rates enacted as to such items as Congress might consider proper subjects for reciprocal trade concessions. The function of Congress would thus be exercised in advance, and the exact limits of the authority of the Executive to modify rates would be fixed by statute. Treaties negotiated on this basis could be promulgated without further reference, either to the House or Senate. This principle has been carried out to a limited extent in Section 3 of the Dingley act, under which several minor treaties have been negotiated with France, Germany, Italy, &c., by the terms of which specified reductions are made by the United States on importations of argols, brandies, statuary and other works of art, &c. The representatives of industries, the products of which might be placed on the conventional tariff list, would have an opportunity to

make any desired representations to the Ways and Means and Finance committees in advance of legislation establishing a maximum and minimum tariff, but thereafter they would be afforded no opportunity, as at present, of killing a treaty that might be regarded by them as undesirable.

W. L. C.

An Appeal for Protection in Canada.

TORONTO, March 28, 1903.—The very representative deputation sent by the Canadian Manufacturers' Association to Ottawa on the 19th inst., was received by the Finance Minister, the Minister of Customs and the Minister of Marine and Fisheries. It was introduced by a number of members of Parliament. Cyrus A. Birge, president of the association, headed the party, which was made up of 20 persons, one for each industry or group of industries. The members of the deputation who spoke for the iron and steel interests were F. H. Clergue, Sault Ste. Marie, Ontario, and F. P. Jones, Sydney, N. S. J. K. Osborne, Toronto, was on hand for the agricultural implement manufacturers, and J. L. Moffatt, Jr., for stoves. Mr. Birge first addressed the Ministers. He stated that manufacturers were unanimous as to the need for more protection. The association, he said, had prepared schedules of duties which represented the consensus of its members as to the fairest apportionment of protection among the different departments of manufacturing production. These schedules he would be pleased to submit to the Government, in confidence. Mr. Fielding, the Finance Minister, inquired "Why in confidence?" "Because," Mr. Birge replied, "it would not be wise to present them unless the Government intended to use them." But Mr. Fielding insisted that, the matter being of public interest, it should be known to the public, for whom the Government was acting.

George Drummond of the Canada Iron Furnace Company also spoke, urging the necessity of an upward revision of the tariff this session. W. K. McNaught pointed to the importations of German goods and the rising demands of labor here, which insisted on wages as high as those current in the United States, where protection was much greater. F. P. Jones spoke emphatically of the need for higher duties on iron and steel. Canada makes billets, but because there is no protection on steel rails there are no mills for the production of these.

F. H. Clergue followed the man from Sydney. He said that he had been in Canada for ten years now and had spent millions of dollars in construction work and on pay rolls. When he first came to Canada the Conservatives were in power. Those whom he represented were used to the policy of protection as it was in vogue in Canada. It had made the United States prosperous. He had every reason to believe it would make Canada prosperous. Then came a change of Government and a rumored change in the tariff. This forced him to change his plans. He bought a site at the American Soo, because he reasoned that if Canada was to have free trade he could the better distribute his products from the American side, could easily get his raw material from Canada, and sell his surplus products in Canada. That was his frank confession. But the tariff of 1897 showed that there was to be very little change made. Turning his attention to rails, he said that there was no duty on the rails he manufactured when he came to Canada. There was a duty on some styles of rails, but he had been assured that when those styles were made the duty would be imposed. He had spent a large amount of money on his rail mill. Could he keep the mill going? It was as well equipped as any mill on earth, but he had to fight a wage scale that was three times as great as that in existence in Great Britain and Germany. He believed he had thrown more life blood into the commercial life of Canada than any other single Canadian industry. Was he not entitled to consideration?

The Government's Reply.

After several other speakers had been heard Mr. Fielding, the Finance Minister, replied. He stated that while he agreed with the deputation in some things he

differed from it in others. He had expected it to lay its information before him, but as he would not promise to keep it from the public, whom it concerned, it was withheld. He added that letters had been received by him wherein he was warned against the designs of the association. In these and other communications received by Ministers the Government was urged to leave the tariff as it is.

A Memorial Presented.

A memorial in which the general case for the association was stated was presented to the Ministers. It was adopted at the Toronto meeting of March 12, referred to in a former letter to *The Iron Age*. In this memorial it is stated that there are 1218 manufacturing concerns in the association, with an invested capital of \$400,000,000, that the association is nonpolitical, that it believes the tariff should be taken out of politics, and that the general tariff should be immediately revised. Referring to the bearing of the present tariff on the trade with the United States, the memorial says:

Our most natural market, geographically—the United States—is meeting us in every branch of industry and at every opportunity with a closed door. . . . We have seen our imports from the United States grow during consecutive years from \$28,000,000 in 1866 to \$53,000,000 in 1896, until last year they reached the enormous sum of \$120,000,000. . . . Of the \$120,000,000 worth we bought from them last year, \$65,000,000 was made up of manufactured goods alone, or more than the value of the wheat grown last year in our whole Northwest. True, we may congratulate ourselves upon the expansion of our great Northwest, but what does it profit Canada if we give the whole of our Northwest crop in the encouragement of United States industries, as opposed to our own, and enhance for the United States farmer the value of his market, which excludes at every point the farmers of Canada?

Of the British preference the memorial has this to say:

Turning to the more distant but friendly markets of Great Britain, we find that the mother land purchased from us last year only \$117,000,000, as compared with \$631,000,000 which she purchased the previous year from the producers of the United States. We purchased from Great Britain, in turn, only \$49,000,000, or about one-third of the amount supplied to us from the United States. And this in spite of the fact that we have given a preference of one-third of the entire duty to the products of the mother country.

Your honorable Government will bear witness to the fact that our association has consented and supported, rather than objected to, the preferential tariff; and yet you must be aware that many of our industries are suffering to-day from the competition of the British manufacturer, with his tremendous output and his cheaper capital and labor.

This grievance is aggravated by the fact that the preferential provisions are taken advantage of by manufacturers of Germany and other countries, who have their goods practically transhipped from Britain, and thus obtain a preference in our markets which they are not entitled to—a preference which is nothing short of an injustice to the manufacturers of this country.

We are desirous that Great Britain and our sister colonies should still be given a preference in this market, but who will defend the Canadian Government in continuing that preference to the detriment of Canadian capital and workingmen, especially when the Canadian producer receives no compensating preference in the markets of Great Britain?

C. A. C. J.

The A. Leschen & Sons Rope Company, manufacturers of wire rope and aerial wire rope tramways, with headquarters at 920 to 932 North First street, St. Louis, Mo., have just opened an office and warehouse at 1717-1723 Arapahoe street, Denver, Col., where they will carry a full stock of their various grades of wire rope, and likewise manila rope, &c. This gives them four branch offices and warehouses, in addition to their headquarters at St. Louis, which are as follows: 92 Centre street, New York City; 137 Lake street, Chicago; 85 Fremont street, San Francisco, and the Denver office above referred to. The company not only manufacture all of the standard grades of wire rope, but they are also sole manufacturers of Hercules colored strand wire rope and of patent flattened strand wire rope. They further manufacture automatic tramways, which load and unload automatically, likewise several types of friction grip tramways and single line and two-bucket tramways.

Askham Brothers & Wilson of Sheffield, England, have sold their plant to Edgar Allen & Co., Limited, of the Imperial Steel Works of the same city.

Lake Iron Ore Matters.

DULUTH, MINN., March 30, 1903.—Shipments of ore from mines to dock have commenced on all three Minnesota roads, but the movement is small and is for the present designed more to relieve mines whose stock docks are crowded than from any pressing need of shipping. No vessels have yet moved and there is no immediate expectation that they will, for labor troubles have arisen that may take time for settlement. All the boats of the Pittsburgh Steamship Company (United States Steel) are ready for action at any time. Harbors are still frozen, but with ice that is thin and weak and the connecting channels at the Sault are not open, though a good tug might pass. The canals are not opened. Lake Superior navigation, which was closed in February, is open, boats moving from Duluth to north shore points. The three Minnesota roads are each prepared for a movement during the year of about 6,000,000 tons, though they may not reach as much. The vessel outlook is not the best and lake rates will be scarcely better than last year.

The Clergue Works.

At the Sault No. 1 furnace of the Algoma Steel Company (Clergue interest) is so nearly ready that fires to dry the stack will be lighted in a few days. The company's charcoal kilns in the woods are running and prior to the opening of the furnace are selling coal to Michigan furnaces. Their by-product retorts are to be fired for the first time in a few days, and their chemical works are ready to receive the pyroligneous acid for treatment. Their No. 1 furnace will run on ferro nickel from their roasters, which have been in successful operation for some months, which is to be mixed with their Helen ore, and some important contracts for the product may shortly be announced. Several thousand tons of ferro nickel ore, from which the sulphur has been eliminated in their roasters, is briquetted for the furnace. The ore docks are receiving a Hulette unloader, to be electrically driven. A mixer is to be installed. There is, I believe, no patent on the mixer in Canada, thus saving the royalties demanded on this side. The ore docks are pretty nearly finished, and steel trestles for the unloading machinery are under erection. No ore has been received, but the first boat leaves for Michipicoton in a few days. The shipments of Helen for the year will amount to about the same as last, slightly more than 300,000 tons. Nearly all the industries of the Consolidated Lake Superior Company, both metallurgical and other, are about ready to operate and are wheeling into line with speed. They are, so far as can be determined now, earning well, and up to the expectations of their owners. Some, indeed, are showing a remarkable earning capacity, far greater than was looked for, and the product of those operating is well sold ahead. The policy of the company is to complete in the same substantial manner as before, and operate the works under way, but to take up no new ventures for the present at least.

The Maas Shaft.

Maas shaft of the Cleveland Cliffs Company, that has been sinking for the past two years, is now about ledged and any day may see it rest. The shaft has penetrated seam after seam of clay between the wet sands and its sinking has been a job that only care, pluck and perseverance could have accomplished. With this shaft on the ledge it will be sunk rapidly the several hundred feet remaining before the ore body is reached, and in 1905 there may be a small shipment from the property. It can scarcely be a large shipper before the following year. The property is a large one, and both in quantity and grade will reward the enterprise of the company operating it. This company's pioneer furnace at Marquette will go into blast in a very few weeks. There have been many delays and obstacles, not the least of which has been the difficulty of securing machinery after it has been built in makers' shops.

Exploration Results in New Districts.

At the Breitung Mine, 20 miles north of Sault Ste. Marie, Ontario, they have some ore on the dump and

are preparing for shipment to the furnaces of the Algoma Steel Company at the Sault. They are erecting a crusher. Their ore is a hard siliceous hematite running from 40 to 50 per cent. iron, but the short haul makes it available when it otherwise would not be at all desirable. In the neighborhood of this mine there is quite an outcropping of ore bearing rocks, but no other deposit of ore has been found yet. Some exploration will be carried on there the present year.

In what is known as the Highland Range of Minnesota, located a few miles back from Lake Superior, and formed by a low range of hills running parallel with the lake, reports of ore finds are continually brought in by settlers and prospectors, of more or less credibility and knowledge. The pits so far sunk are very shallow and really little indicating the presence of iron in anything more than bog ore or float has yet been shown from the district. Many men are there, some few sinking pits but most traveling through the woods on snowshoes looking for indications. The rocks of this district are eruptive, chiefly diabase and gabbro, and some of them resemble in some little degree the quartzites and slates of the Mesaba formation. Titaniferous magnetite is to be found in place in a good many localities of the Highland Range, especially to the northeast and near the contact of the gabbro with older rocks.

In the great district east from Lake Nipigon, north of Lake Superior, exposures of beautiful slate hematites have been followed for miles. One prominent exposure is at least 10 miles in unbroken length. But the ore is not better than 40 per cent. iron and is therefore useless now. The question of transportation is a very serious one.

Some work has been carried on during the winter northwest and west of the Canadian ports at the upper end of Lake Superior, but nothing of more value than was heretofore known has been shown. Generally speaking these ores contain sulphur. Where they do not and have no other deleterious element, they are usually lean. But exploration has now gone far enough in that district to show vast deposits of ores that are probably capable of concentration, and apparently have nothing the matter with them but an excess of silica. There is hope for these ores, especially on account of the fact that they lie contiguous to large undeveloped water powers, from which power for concentration can be procured easily and cheaply. These deposits are not so far from Lake Superior that the matter of rail shipment would be an insuperable obstacle, and railway connection is now near by. There may be some time, when the need of more ore is recognized and when the cost of concentration is not so great a factor as now, a considerable iron mining industry in the district.

To Work Titaniferous Magnetite.

The work of exploration in the titaniferous magnetic formation of Cook County, Minn., a considerable distance northeast from Duluth, has been carried on for some time by the Johnson Nickel Mining Company, somewhat notorious among mining men for their methods of procedure, &c. Just at present the company state they have an urgent call for some of their ore, for tests, and they have sent 15 tons by dog train 30 miles to the terminus of a once a week railway, whence it will ship 1000 miles to a furnace which Mr. Johnson, head of this company, says he has perfected for smelting these titaniferous ores, and that he has made direct process steel at low cost. If he is correct there will be a great deal of exploration in that section, as it is generally known that immense outcroppings of these ores exist there. But his statements are not as yet corroborated by those in whom the mining public has confidence.

D. E. W.

The financial troubles of M. Zier & Co., manufacturers of boilers, New Albany, Ind., which have been before the courts since December, have developed a sensational receivership case that landed several prominent citizens, including politicians and attorneys of New Albany and Louisville, Ky., in jail and made the unusual record of reaching the United States Supreme Court from the local court in a little over a month. It also

brought into question the jurisdiction of Indiana courts in bankruptcy cases. A judge of the lower court and an attorney, formerly Judge Advocate General of the army in the Philippines, narrowly escaped imprisonment, the higher judge passing caustic comment on their actions and requiring certain promises from them in view of leniency extended to them. The chief prisoners are out on bond with leave granted by the Supreme Court to file petitions for habeas corpus and certiorari, returnable April 6.

The Armstrong Universal Ratchet.

The universal ratchet manufactured by the Armstrong Bros. Tool Company of Chicago is especially adapted to drilling holes in cramped places, as the drill may be operated in any position where it is possible to move the handle either in a vertical or horizontal direction a distance of only 2 inches. The most prominent feature of the design is that the axes of the two trunnions on which the handle turns are at an acute angle with the axis of the drill. The pawls, the arrangement of which is shown in the drawing, do not slide lengthwise on the ratchet teeth. For ordinary work the handle can be rigidly fixed by fastening the set screw in one of the three countersinks as in the ordinary ratchet. The tool is made in two sizes—one for holes up to 1 inch in diameter and the other for holes up to 2 inches. In the larger size there are 12 large teeth in the ratchet



THE ARMSTRONG UNIVERSAL RATCHET.

and five pawls, which engage one at a time, so that the pawls catch 60 times during each revolution.

Steel Interests In Copper Mining.

In view of the fact that the property of the Calumet & Arizona and kindred copper mining companies is held chiefly by steel interests, and of the further fact that this company are now preparing for quadrupling their output at no distant day, their annual report, soon to be delivered to stockholders, is of considerable interest.

The report covers the ten months ending with December 31, 1902, and is for the second year of the company's existence. They were incorporated March 1, 1901, with \$2,500,000 capital, in 250,000 shares, of which only 200,000 have ever been issued. The furnace was blown in November 15, 1902, and from that date to December 31 the product was 2,066,647 pounds of copper, 99 per cent. fine. For the full month of December the product was 1,600,000 pounds. On account of the small number of tons of ore smelted for each ton of bullion produced, the gold and silver values in the bullion are comparatively low, averaging \$8 a ton for December, but these values are now increasing, and for February are close to \$12 per ton of bullion. A second furnace will be blown in during April, and the directors expect the daily product to be 50 tons of copper. A third furnace is now being built as a reserve. During December the number of men employed was 321, of whom 166 were at the mine and 155 at the smelter.

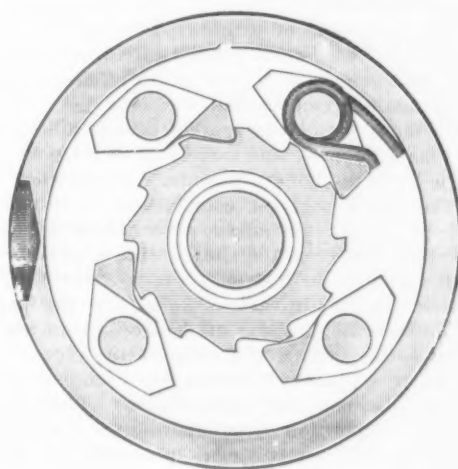
"Ore is transported from the mine to the smelter, at Douglas, by the El Paso & Southwestern Road, and we have contracted with Phelps, Dodge & Co. to act as sell-

ing agents for the year 1903. We have entered into an agreement with the Copper Queen Consolidated Copper Company that all boundaries of properties between them and ourselves shall be by vertical lines.

"The smelter at Douglas was completed and in operation in 11 months from the letting of contracts for same, which we consider a remarkable record, as also the December product of one 250-ton furnace so soon after blowing in. We give credit for this to I. L. Merrill, superintendent, and D. H. Heller, smelter superintendent.

"We have expended on modern equipment and machinery, at mine, \$117,624; at smelter, \$228,567.90; total, \$346,191.90. The value of supplies, copper and cash on hand December 31 is \$307,834.19, while entire liabilities exceed this by \$102,018.15. The property has been placed on a good paying basis, the mine developed to furnish ore for at least six years ahead, and construction expense at present plants is well on to completion. The earnings from our operations will be very large each month and the liabilities will be paid soon. The developments warrant the belief that we have a most valuable property.

"During the ten months of this report there were



spent on the property the sum of \$551,099.14, of which \$241,573.72 were operating and development expenses and \$309,525.42 construction. During the time we have installed at the mine one 20 x 60 first motion Nordberg hoist, a steel head frame, one air compressor, a saw mill, electric generator, Prescott station pump for 1100 feet lift, and have increased the power plant by 600 horse-power. We have built ore bins of 1500 tons capacity and a tram railway of 600 feet. The year's openings amounted to 4,657.46 feet, and the main shaft is now at a depth of 1190 feet. The year's work has materially increased our ore reserves and demonstrated the fact that at the 1050-foot level the ore bodies are larger and richer than above. We have 1,050,000 tons of ore in sight and are gradually adding to this reserve. We hope to have the second smelter stack running in April, 1903."

It is understood that a second shaft will be sunk as soon as convenient, some distance south of the present, and that the smelting capacity now operating or under construction will then be doubled. The annual meeting of the company, together with those of the associated Calumet & Pittsburgh and Lake Superior of Pittsburgh, will be held at Bisbee, Ariz., in April.

Their business having outgrown their present plant, the Brylgon Steel Casting Company of Reading, Pa., have selected a site of 10 acres at New Castle, Del., where they will erect a new plant. The property fronts on the Delaware River, and the proposed building will be 65 x 616 feet, which will be equipped with the latest appliances. As soon as certain preliminary arrangements are completed contracts for the erection of the plant will be let.

The Inventor and the Trust.*

BY WILLIAM STANLEY.

Next to the national wealth of this country, I believe our national growth, strength and prosperity are due to the American inventor. I by no means wish to sing his personal praises, nor do I desire to compare his individual importance with that of other highly trained men devoted to other professions, or to the arts, but I believe that there is more national capital, more reserved strength and more potential good to come in this purely American type of man than in any other type that we have as yet developed.

I believe the present methods adopted by the industrial trusts in dealing with the inventor, his work, his aims and rewards will, if uncontrolled in the future, annul his usefulness, discourage his endeavors, disgust him with surrounding conditions, and finally remove him from the land.

The industrial trusts now regularly employ, on salaries or by retainers, bureaus known as boards of patent control. To these boards is intrusted the problem of controlling the arts, by means of patents. They are expected to purchase such patents as they deem expedient, to manufacture any others they think necessary, to gather up "fresh lines of patents" wherewith to assail competitors, to bring suits against infringers, real or imaginary, and generally to operate an offensive patent campaign against competition.

No more pernicious system of controlling trade has ever been devised, and none that is in reality as fatal to the value of honest patents, whether they be owned by the trusts or their competitors. To speak plainly, these patent bureaus pursue an organized effort to obtain illegal support from the United States courts. They, too, often endeavor to restrict trade by means of dishonest patents, obtained in various ways from the Patent Office, for the specific purpose of controlling an art long disclosed to the public, and consequently free.

The trust patent bureaus are occupied in litigation directed against their competitors. They endeavor to weaken competition by exhausting the resources of their opponents in costly legal proceedings, prosecutions brought under questionable patents, and sustained by expert witnesses, who are simply the salaried testifiers of the trusts.

A few years ago an important advance was made in a well-known art. The invention employed new and specialized machinery and the application of newly discovered data and facts. Shortly after the inventor had successfully completed his working system he demonstrated it before a number of trust officials, plainly describing its operation and pointing out its far reaching possibilities. The trust proceeded as follows: First their attorneys drew up a patent specification, cleverly disguised as a "blanket patent," to cover the art on broad lines, and then sent it by special messenger to Europe to find an inventor to sign it. After a little preliminary work the messenger returned with the document duly executed. The papers were then delivered to a second trusted attorney, who was instructed "to get it through the Patent Office." The Patent Office was presumably honest, but of course ignorant of the true condition, and in a very short time granted the patent.

Here, then, was a patent that cost the trust a few thousand dollars, signed, sealed and delivered, upon which the trust proceeded to issue new stock to the amount of several million dollars, a patent that on its face was genuine, but in reality was the grossest fraud.

To keep the real inventor from making trouble the trust allowed him a small pittance, kept its spies about him, copied his private papers, bribed his servants, spoke of him as untrustworthy, irresponsible, and generally cast stones at him. But in this case justice to the public, at least, was done. The United States Circuit Court on the first hearing brought under the fraudulent patent disqualified it, although in entire ignorance of its real history.

We may well consider whether this was an attempt to restrain trade, and whether such attempts are likely

to stimulate invention by holding out suitable rewards to inventors.

One more example will illustrate a less heroic and more common trust trick. The United States Patent Gazette suddenly discloses the issue of a patent covering an important invention in an art. The trust attorneys see it, obtain copies of the patent from Washington, and decide to have it. The inventor is looked up and an offer to purchase his invention is made, coupled with some statement to the effect that one of the trust's inventors had worked out the same result some years before. Now, unless the inventor sells the patent then and there, he may be subjected to the following coercion: First, notice is served on him by the United States Patent Office that (although this patent was issued to him) an interference had been declared between his patent and a new application. Testimony is then taken as to the dates of invention claimed by both parties. In all probability the real inventor proves his priority, and the contending application is dismissed; but—and here the important part comes in—the trust lawyers are now in possession of the inventor's sworn dates of invention, back of which he cannot go. Another application signed by another applicant is put into interference with him. Again the dates of invention are given, and the inventor now realizes that he has a hard fight for his patent on his hands. Testimony is taken (the trust does not appear in the matter, of course), and the interference drags along, sometimes for years. Occasionally the inventor is visited by the trust representatives, and suggestions that he sell out are given him in a roundabout way. In 99 out of 100 cases he sells for a trifle and finds himself impoverished and unknown.

I am of the opinion that many of the present evils arising from the misuse of patent control may be avoided:

First, by limiting the number of patents granted to those who clearly disclose invention, and by refusing the great majority of applications for so-called tributary, or subsidiary improvements, for these applications rarely disclose any new idea and are usually based upon the particular application of well-known engineering or scientific data—that is to say, they attempt to control the application of engineering methods to a particular subject. Great numbers of these "supporting" patents are taken out by corporations in the name of their engineers, for the reason that each patent obtained serves as a basis for expensive litigation against competitors. Thus in one branch of a particular industry I remember that not long ago 40 separate suits were brought against an alleged infringer, who in reality was entitled to manufacture his apparatus by reason of the legal expiration of the master patents covering the fundamental discovery in the art. Therefore, I unhesitatingly state that the Patent Office should limit its patent rights to the applications that disclose invention, and refuse those based on engineering equivalents or engineering skill.

Second, I believe that our system of patent litigation is responsible for the troubled conditions that now perplex the courts. Under the existing system of litigation the court never or rarely sees or hears the expert witnesses, and, therefore, cannot judge of their truthfulness or character. All expert testimony is taken before a stenographer or typewriter, who is nominally an officer of the court, but in reality has no power to enforce the ordinary rules governing the taking of testimony, has no power to limit the length and cost of examinations or to confine the witnesses to the subject matter at issue; consequently the strongest—that is, the richest—party may completely exhaust its opponent by direct or cross examinations of great length (a most expensive element in patent litigation), and thus, in fact, tire him out. I believe that testimony should only be given by qualified experts satisfactory to the court, who, instead of being the accomplices of the lawyers employing them, should, in fact, be court advisers; men capable of fairly advising the court as to the facts and fundamental data at issue. Such testimony should be given before the court, and not its deputy. It should be controlled by the court and be limited to a terse and clear statement of the principal facts, and not be allowed to generally roam around on unimportant outlying subjects.

* From a letter published in the Springfield Republican.

Third, I believe that the laws applicable to a conspiracy to injure an individual or a business by unnecessary litigation should be strictly enforced, and possibly modified, so as to control the coercion measures now too commonly employed by the trusts. These laws should plainly apply to those cases where the trust, relying on the absence of individual responsibility of its officers, used its power to coerce an individual. "Sell us your patents or we will clean you out of business by legal expenses," said the head of a patent bureau to one of my friends a few years ago. "No," said he, "I'll fight." "Well, then, fight if you choose, but remember I warned you." Individually this gentleman was an honest, conscientious, fair minded man; as the mouth-piece of his trust he was a roaring lion, but as yet he has roared in vain.

In considering the broad question of trust control we must, however, remember that many of these enterprises are still in the hands of their original promoters; that this is a promoting generation which is absolutely certain to pass away when the clarifying effect of less prosperous times appears. We must remember that the men dictating trust policies are of a very temporary type in general, uneducated in the true, broad sense. They are men who are primarily anxious to place their securities on a sufficiently remunerative basis to attract the public as purchasers. It is to be hoped that they will be replaced by better educated, broader minded and cleaner men, who, if they do not venture on as daring financial voyages, will discourage the tricky methods now in vogue for coercing competition and restraining trade.

State versus Private Manufacture.

An interesting incident has been brought out in the letting of a contract for cast iron pipe for South Australia. *Australian Hardware and Machinery* reviews the situation as follows:

As is well known, the Government of that State has for some years had a pipe making factory of its own. This shop at Glanville has hitherto been equipped for the manufacture of pipes "on the bank" only, and a recent proposal of the Ministry to add a vertical plant, then in the market, was defeated by the Legislative Council. The desire of the Government to purchase this second-hand machinery was explained in part by the fact that a quantity of large sized pipes was early needed, and to prevent any feeling that the rate payers might be paying too much for State made mains, it was promised that the contract should be open to private firms. By the use of a vertical plant, it was urged, the pipes could be produced for about £1 per ton less than it now costs to cast them horizontally. Figures were quoted to show that from her own works South Australia has been paying less for pipes during the last few years than either of the neighboring States, who depend entirely upon manufacturing and importing firms.

Although not allowed to acquire the vertical plant, the Government carried out its intentions in other respects. Tenders for the supply of 9078 tons of cast iron pipes, comprising 18,000 6-inch, 4000 8-inch, 10,000 10-inch and 9500 12-inch, were invited throughout Australia. In response eight tenders were received—one from Sydney, three from Melbourne and four from Adelaide, one of the last mentioned being sent in by the Engineer in Chief on behalf of the Glanville work shops. The amounts and signatories of the other tenders have not been disclosed, but it was announced that the departmental offer of £58,000 (about £6 7s. 9d. per ton) was over £9000 lower than the lowest private tender. Needless to say, the contract went to the Glanville work shops.

The disparity between the departmental and private estimates for the work has naturally loosened many tongues, and demands for further particulars have been made in various quarters. That the Glanville work shops can fairly underquote, and by such a wide margin, experienced private firms, some of whom would have used the cheaper vertical process, is widely questioned. It is maintained that some items in the charge

sheet must have been overlooked or advantage secured in some other way. The department avers, on the other hand, that every legitimate expense has been included. Before tendering, quotations were invited for pig iron and coke, so that the price for the pipes might be based on the actual cost of the material. A local firm offered to supply 10,000 tons of pig iron at 66 shillings, and 1300 tons of coke at 47 shillings, or £36,050 altogether. These offers have since been accepted. Interest has been allowed on capital, provision made for any further equipment that the shop may require, and "a larger amount added for supervision than I think has ever been done before," so says the Commissioner of Public Works. In defense of the Engineer in Chief's ability to carry out the contract so cheaply, it is urged that the Glanville shop is provided with a staff of men accustomed to this class of work, and that having its own shipping facilities at the door, the materials are not subject to wharfage or land carriage. With these advantages, and his plant in going order, the Glanville manager is in a much better position, it is contended, than the next lowest tenderer, who belongs to another State, but who offered, if given the contract, to manufacture the pipes at Kilkenny, near Adelaide. Then as to any suggestion that the product will not be subject to such vigorous inspection as would be the case with a private contractor, it is pointed out that the examination will be in the hands of the Hydraulic Engineer, who has nothing to do with the manufacturing department.

The claim that the State shop at Glanville can turn out pipes more cheaply than private establishments is of long standing. More will be needed, however, than the present situation reveals to convince practical people that such is really the case. We are given figures as to the actual cost of materials, but will these materials produce the quantity of pipes required? And is the difference between the price paid for the raw product and the price to be received for the finished article sufficient to cover the cost of manufacture, including every item of expense which the job ought fairly to bear? This contract presents a splendid opportunity for the Government putting its claim to cheap manufacture beyond dispute. A thorough account could be kept and every particular laid open to the gaze of all who care to see. But this is evidently too much to expect, judging by the secrecy maintained regarding the tenders.

Effect of an Ice Jam at Niagara.

NIAGARA FALLS, March 28, 1903.—The fact that an ice jam that formed on the reefs at the head of the American channel and above Goat Island caused the American fall to run nearly dry is quite a severe intimation to the commissioners of both the New York State reservation and the Victoria Free Park of a condition that may develop if the diversion of water for power purposes continues. In the development of power it may, and undoubtedly will, take many years to accomplish what the ice of Lake Erie did at Niagara on Sunday, March 22, and which lasted for an entire day. It was observed that the ice jam was forming late Saturday afternoon, but by Sunday morning it had become so firmly wedged that nearly all the water of the American channel was diverted to the outer or Canadian channel.

The American channel is that between the New York mainland and Goat Island, and is quite broad. When the river is at its normal flow this channel is the scene of the most boisterous, tumultuous piece of rapids above the falls. After the ice jam had formed the ledges in this channel were quite dry. Under this unusual condition people walked from Green Island in the center of the rapids up to the head of Goat Island and moved about all the river bed toward the Goat Island shore.

Under customary conditions the American fall is of great volume, but during the ice jam there was only enough water going over the brink to curtain the cliff from view, and even this was not effected along the entire line of the fall. Photographs taken during the remarkable condition show only a veil like sheet dropping from the edge of the precipice. It is recorded that a similar condition existed at Niagara on March 29, 1848, but the opinion of the old residents appears to be that the recent spectacle was more wonderful.

The Activity in Bituminous Coal Mining.

BY FREDERICK E. SAWARD.

The price of bituminous coal, which is the great steam raiser of the country, is advanced April 1 above last year's figures fully 50 cents a ton, due to the increase of railroad tolls and miners' wages; tolls are up 10 cents a ton and wages increase amounts to 28 cents a ton. The bituminous trade is unusually active, and it is difficult to supply coal in most markets at the high prices now ruling. Prices of Clearfield coal at the mines are \$1.75 to \$2, with Cumberland and Virginia coal at \$3.25 to \$3.75 at the leading ports. People in the trade look for large consumption and activity throughout the year. In view of all this it is not strange to read of the greater tendency to get hold of coal lands, and there are companies being formed to develop them in all parts of the country, to use either in the raw state or as coke. The Bessemer Steel, Coal & Coke Company are making contracts for the opening of 6000 acres of coal property near Fairmont, W. Va., and as soon as possible work will be commenced and pushed to a rapid finish. The company also expect to erect 100 coke ovens. The Kanawha & Hocking Coal & Coke Company have secured the coal operations of the Boomer Coal & Coke Company in the Kanawha field. The Stony Creek Coal & Coke Company, who recently bought the Bethel Coal Company's property, near Holsopple, W. Va., are now mining 250 tons daily, but are working on plans to open mines with a capacity of 2500 tons daily. The company control about 3000 acres of land.

Major Thomas Merriam of Syracuse, N. Y., together with his brother, whose home is in Chattanooga, and other capitalists are forming a company to develop the Jarnagin and Merriam lands, near Crossville, Tenn. This tract comprises about 10,000 acres of coal and timber land, is traversed by the Tennessee Central Railroad and will be easily developed. The proposed company will put in coke ovens, and it is claimed will be shipping 25 cars of coal a day inside of six months. At Waldensia, the mining town built by the Chicago-Tennessee Coal & Coke Company, the coke ovens are now in full blast. This company are shipping on an average of 15 cars of coal a day, in addition to the large amount consumed by the coke ovens.

Western Belmont and Southeastern Harrison counties, Ohio, are figuring in another large coal deal. The block is one of the largest that has been optioned in Eastern Ohio. It starts at Fairpoint, on the C. L. & W., and extends along this road to Banock, a distance of 5 miles. From the railroad it extends northwest and north to New Athens and Stillwater Creek. The block contains over 7000 acres of Pittsburgh No. 8 vein of coal. The options range from \$20 to \$60 per acre, and will average about \$30. John M. Henderson and Attorney George Cooke of Martin's Ferry have arranged for the sale of the territory to Pittsburgh parties. This territory is considered one of the most valuable blocks of coal in Eastern Ohio, and the sale will do much to develop that section of the two counties and place over a quarter of a million dollars in the farmers' hands. The frontage on the railroad is a valuable advantage, as it offers several splendid sites for openings to mine all of the 7000 acres.

The Tutwiler Coal, Coke & Iron Company are building 50 coke ovens at their Short Creek coal mines, located on the Ensley Southern Railroad, 5 miles from Ensley, Ala. This is believed to be the first battery of a number of ovens to be erected by the Tutwiler Company at their mines.

The Iaeger & Southern Railroad, now under construction, will be extended from Iaeger to Tip Top, Va., in Tazewell County. The engineers have finished surveying the route. It will be 56 miles in length and open up a fine coal and timber territory. There are now already completed 8 miles of standard gauge road on the Iaeger end of the line, and 7 miles of narrow gauge, which will be at once widened.

The Ozark & Sulphur Mountain Traction Company have been incorporated in Arkansas to build a line from

Harrison to Clarksville, a distance of 100 miles. It is claimed that "there is no road intervening between Harrison and Clarksville, and there are vast bodies of fine anthracite coal lying between the Boston mountain and Clarksville, and which our road would pass through. Newton County is considered the best timbered county in the State, especially beyond Jasper and on the Boston mountain."

The Rock Island Railroad Company have taken control of the coal mines at Hartshorne and Gowen, in the Indian Territory. Some two years ago the Choctaw Railroad leased the Hartshorne and Gowen properties to Bache & Denman at a figure which was most advantageous to the lessees. When the Rock Island absorbed the Choctaw the lease was at once detected as a money maker for the other parties, and an effort to buy Bache & Denman out was made; and this has now been accomplished. The Gowen and Hartshorne mines involved have an annual production of about 400,000 tons. Bache & Denman will control the Alderson Coal Company, as well as several new properties recently acquired in Western Arkansas. Carl Scholz, in charge of the Rock Island mining department, will have control of the properties. He says that with the other mines in the Indian Territory the company have an output of 50,000 tons a month.

It is stated that Philadelphia capitalists have bought up a big tract of coal land in Western Kentucky. Phil B. Shield, an attorney in Richmond, Va., who is trustee for a vast tract of land located between the forks of the Big Sandy River, in Kentucky, has entered into a contract for the sale of the land to a syndicate which will develop the coal on the property. The tract, which contains 80,000 acres, is held by the present owners under a grant from the State of Virginia in 1796, and it has never passed from the original owners.

The Southern Railway will, within a few days, send an engineering corps to make a survey for a line from Pioneer, Tenn., a station on the Knoxville & Ohio branch, to a point on the Cincinnati Southern Railroad, at or near Helenwood, Tenn. The line will be about 35 miles in length. It will be a coal road and, if built, will penetrate some of the richest coal beds in the Tennessee-Kentucky section. It may be that the Tennessee & Kentucky Railroad, owned by interests represented by Bird M. Robinson of New York, will be incorporated in this scheme, as that road extends from the Cincinnati Southern in the direction of Pioneer.

Announcement has been made that the control of the Union Coal & Coking Company, a West Virginia corporation, with a capital of \$2,500,000, has changed hands. It is believed that the company have been purchased by interests closely affiliated with the United States Steel Corporation. The report that the company have already been turned over to the latter company is denied. The lands of the Union Coal & Coking Company are situated in McDowell County, and comprise thousands of acres of coking coal. Within the last year the Steel Corporation have made extensive purchases in West Virginia territory, and are now said to have their first batch of coke ovens—1500—over on the Tug River division of the Norfolk & Western Railway, ready to put in blast.

Owners of iron works who have invested in Fayette County, Pa., land are developing the coal. Latest is a company in which are interested Alexis Thompson, president of the Republic Iron and Steel Company; Joshua W. Rhodes, president of the Cherry Valley Iron Company; E. N. Ohl, a director of the Republic Iron & Steel Company, and Wayne Wills. The company will be operated in the interests of the Republic Iron & Steel Company. They will develop coal lands in the Connellsville region, and will build 400 coke ovens, work on which will commence at once. Their coke properties include Connellsville Coke Works, Nicholson, Pa.; Pioneer Coke Ovens, Thomas, Ala. The coal properties in part are: Springfield Mine, Springfield, Ill.; Sayerton Mine, Thompson Mine and Warner Mine, near Birmingham, Ala.; Woodside Mine, Connellsville district, Nicholson, Pa.

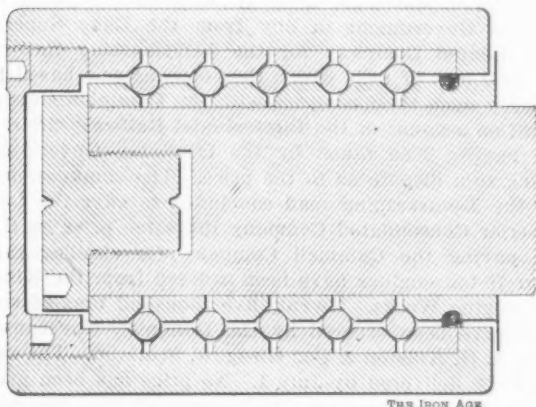
A company of West Virginia and Pennsylvania capitalists, who own 15,000 acres of land in Taylor and Barbour counties, W. Va., will open extensive mines at Cecil, on the Grafton and Belington branch of the Balti-

more & Ohio, 5 miles south of Grafton, W. Va., and will build 200 coke ovens. The best electrical mining machinery will be installed.

The Gurney Multiple Ball Bearing.

The Gurney Ball Bearing Company of Jamestown, N. Y., have recently equipped a shop truck with their bearings, which is intended to carry a load of 40 tons on four bearings. This is a heavier load than is carried on the journals of the largest freight cars, and double the load of an 80,000-pound capacity freight car, as in the latter case there are eight bearings. As will be seen by the engraving, the main point in the design is the distribution of the load over an indefinite number of balls. It matters not how great the load may be, enough balls can be used to safely carry it. In each of the bearings referred to there are 130 $\frac{3}{4}$ -inch balls. Each ball is guaranteed to sustain 35,000 pounds between two plates without crushing. The balls have two-point bearing in V-shaped 90-degree grooves. The balls immediately over the center of the journal support the maximum load of 350 pounds, or about 1 per cent. of their guaranteed efficiency.

The principle of the bearing will be readily understood from the drawing. There is a series of longitudinally movable rings, only the journal having beveled edges to form ball races between them. There is also a series of rings in the box, and there is an adjusting



THE GURNEY MULTIPLE BALL BEARING.

ring. Screwing up the latter brings all the balls in contact with the race rings. The race rings being movable longitudinally and being beveled at the same angle of 45 degrees, the load is automatically and uniformly distributed over all the balls. The balls run in a perfect four-point bearing with a purely rolling motion and no rubbing.

The Eagle Foundry & Machine Company.

Plans for the new foundry of the Eagle Foundry & Machine Company, 1025 to 1027 South Canal street, Allegheny City, Pa., have been prepared by F. Felkel, civil engineer and architect, 419 House Building, Pittsburgh. While the size of the proposed building is of moderate dimensions its design developed a number of features which will attract the attention of those interested in the rapid improvement in modern manufacturing plants. The lot is inclosed by buildings along the east and west sides which belong to other owners and is of irregular shape, being 77 feet 3 inches wide at South Canal street and 70 feet 8 inches at Carpenter's alley, by a depth of 143 feet 6 inches. The present foundry floor is about 7 feet below the level of South Canal street and has a fall to the alley of about 3 feet 6 inches. The cupola platform had to be located with reference to the contemplated elevated West Penn Railroad on South Canal street, the rails of which are about 12 feet above the street level.

The Eagle Foundry & Machine Company own also a lot of irregular shape north of Carpenter's alley, extend-

ing to Main street, of about 100 x 103 feet, upon which will be built in the near future a gallery machine shop, the first floor of which is to be above high water of the Allegheny River, which is assumed to be there about 5 feet below the surface of South Canal street. The crane runways of the foundry and machine shop are to be continuous. To comply with all these conditions made the design a very difficult one.

The east line of the two lots being continuous and straight and nearest at right angle to the street lines, had to be selected as the base line. As the property is bordered by foreign buildings at both sides provisions for light had to be made in the roof, which was done by arranging a high main center span with two lower wings. The latter are to have sawtooth roofs, with continuous north lights, sawtooth alternating with flat roofs, so as to avoid the objectionable gutters of continuous sawteeth. Over the main span a flat roof, having a fall of 1 inch to the foot, supported by latticed steel trusses on steel columns, has been adopted for two reasons: First, to get the highest windows possible, 16 feet $3\frac{1}{2}$ inches at sides, and, second, to secure ample space for lifting doors in the south end of the building to allow the cranes to run out across the lot intended for the machine shop. This lot is to be used for the present as a flask yard, &c., which will permit the stacking up of flasks, and thus gain space, besides facilitating the handling of flasks. The main traveling crane is to have a lifting capacity of 20 tons. The span is to be 40 feet between rail centers, and the top of the rail to be 27 feet 6 inches above the floor level, to cover the molding floor for heavy work. In the east wing a 5-ton traveling crane is to be located, with a 15-foot span, to cover the molding floor for small work. This crane is also to run out of the building and across to the lot on Main street. The cupola platform, 26 x 60 feet, at the north end, is on a level with the projected elevated West Penn Railroad, and has two stories below. The office is in the northwest corner at the level of the cupola platform, with engine, boiler and blower rooms below. One 72 and one 48 inch cupola and an 8 x 7 foot elevator have been arranged for. The core ovens and tumbling and cleaning rooms are located in the west wing. The building is to be of steel construction with brick walls and asbestos roof on 2-inch roof boards. The cupola house is to have a steel and concrete platform, roof and walls, thus, besides being fire proof, avoiding also the noise incidental to carting and dropping material on the cupola platform.

In connection with this design the architect calls attention to the great importance of planning buildings for which traveling cranes are necessary so as to allow the cranes to run out of such buildings and the longest possible distance over available yards. Such an arrangement will triple the usefulness of the cranes, saving time and expense of yard labor, railroad switching, &c. It will effect considerable saving in the purchase of real estate and will also make it possible to locate a far greater number of such plants along a railroad or river front, as this feature will enable the placing of the shortest dimension of the plant along the railroad or river. For instance, in a properly designed open hearth steel plant the use of such traveling cranes to their full working limit will do away with a large amount of standard and narrow gauge railroad tracks with inclined planes up to the charging platforms and possibly it would save the charging machine, as a smaller apparatus of that kind may be attached to the crane. This shows the desirability of consulting a specialist experienced in the planning of industrial works before purchasing real estate for a plant, as the lay of the ground frequently determines largely the plans of such works. This special experience in the planning of modern industrial plants applies probably even more to reconstruction where the judicious use of limited space is even more difficult than the planning on a green field.

The Eagle Foundry & Machine Company do a general foundry and jobbing business, cultivating especially the trade of machine shops and rolling mills intending to take up the construction of gas engines in the future. Their city trade has made it imperative for them to remain at their present location.

Bids Invited for Two Gunboats.

Each to Have a Machine Shop.

WASHINGTON, D. C., March 31, 1903.—The Navy Department has announced that on May 19 bids will be opened for the construction of two gunboats of about 1000 tons each, to cost, exclusive of armament, not to exceed \$382,000 each, under conditions that will permit bidders to submit an entirely original design for one of these boats except that in the matter of boilers and equipment well tested types must be adopted. Bidders will be permitted to present alternative propositions as follows: 1. For one vessel in all respects according to the Department's design. 2. For one vessel in all respects according to the Department's design, except that the type of boilers may be selected by the bidder, subject to the conditions below. 3. For two vessels, one on the Department's design, and for one vessel on the Department's design except the boilers, which may be of the type selected by the bidder, subject to the conditions below.

Bidders submitting a bid based on the use of boilers other than the type specified in the Department's design will be limited strictly to the boiler space, the weight allowed for boilers, including water, fittings, appurtenances and smoke pipes, and the maximum steam pressure and air pressure on trial allowed in the Department's plans and specifications. No type of boiler will be accepted which has not already been installed on one or more United States naval vessels, or which has not been successfully tested under steam by the Bureau of Steam Engineering of the Navy Department. No bid will be considered involving any change whatever in the hull of the vessel or the propelling engines, and the speed on trial required in the Department's design must be adhered to. The vessels are to be built, fitted and equipped complete for sea by the contractor in accordance with plans and specifications to be adopted by the Department, with the exception of ordnance outfit and such articles and sea stores as will be furnished by the Government. The contractor is to fit and secure, however, all ordnance and ordnance outfit.

In order to prevent misunderstanding, the Department has decided that after the bids are opened it will not receive from bidders directly or indirectly "any communication, plan or explanation, either verbally or in writing, tending to explain or modify their bids in any way whatever." The maximum time allowed for completion will be limited to 20 months, with penalties for delay. The speed of the vessels is fixed at 12 knots, but should it fall below 12 knots, and exceed 11 knots, the vessel will be accepted at a reduction of \$10,000 per knot. Should the speed fall below 11 knots, however, the vessel will be rejected at the discretion of the Secretary of the Navy, or accepted at a price mutually agreed upon. The general dimensions and features of the two vessels are as follows:

Length on load water line.....	174 feet.
Breadth, extreme, at load water line.....	35 feet.
Displacement on trial, about.....	1085 tons.
Mean draft to bottom of keel at trial displacement.....	12 ft 3 in.
Mean draft, full load, about.....	13 ft. 5½ in.
Total coal bunker capacity, about.....	200 tons.
Coal carried on trial.....	100 tons.
Feed water carried on trial.....	4 tons.

The armament of each vessel will consist of six 4-inch rapid fire guns, four 6-pounder rapid fire guns, two 1-pounder rapid fire guns and two Colt automatic guns. This battery will be furnished by the Government, and will be mounted as follows: Four 4-inch guns on the main deck at side, two forward and two aft, arranged to secure a fore and aft fire, respectively, and the maximum train; two 4-inch guns on gun deck in broadside, arranged to secure about 80 degrees train forward of beam, and 45 degrees abaft the beam; 6-pounders in broadside on the gun deck to secure the largest train practicable without unduly cutting away the ship. The 4-inch guns mounted on the gun deck will be arranged to stow within load water line. One-pounder and smaller guns will be mounted in commanding positions.

The engines will be of the vertical, twin screw, triple expansion type, of a combined indicated horse-power of 1000. The steam pressure at the engines will be 250 pounds. The stroke will be 21 inches and the revolutions 225 per minute. The ratio of high pressure to low pressure cylinder will be about 1 to 8. There will be two boilers of the Babcock & Wilcox marine type, having a total grate surface of at least 100 square feet and 4200 square feet of heating surface, and must be able to furnish steam for the main engines and all the necessary auxiliary machinery and other steam machinery throughout the ship, with an average air pressure in the ash pits of not more than 1 inch of water.

An unusually well equipped machine shop will be provided for each vessel, and the following machine tools of approved make and design will be furnished and installed by the contractor with proper line and counter shafts, driven by an approved engine or motor, and all the necessary spare parts and tools:

One back geared, screw cutting, extension gap lathe, to take 16 inches over the ways, 32½ inches in gap, gap 18 inches, to take when extended 46 inches between centers.

One column shaping machine, 15-inch stroke, 15-inch traverse.

One back geared, vertical drill press, to drill up to 1½-inch holes, 12 inches from edge of work, and to have adjustable swinging table.

One emery grinder, two 12 x 1 inch wheels.

Two 6-inch swivelling bench vises.

W. L. C.

Canadian Notes.

TORONTO, March 28, 1903.—It has been decided by the Ontario Government to buy from the Lake Superior Consolidated Company for the Temiskaming Railway the 2500 tons of rails which the company purchased for delivery upon their contract with the Dominion Government, on account of the Intercolonial Railway, the rails not having been taken by the Dominion Government owing to a dispute as to the price. The commissioners for the Temiskaming road concluded to offer the Lake Superior Consolidated Company the same price as they are paying the Cammell Company for similar rails. Four 70-ton engines have been ordered from the Kingston Engine Works. Twenty-five thousand tons of steel rails have been ordered by the Dominion Government from A. G. Kidston & Co., Glasgow, Scotland. The rails are to be delivered by July 1. No price has been given out by the Government. It is reported that the company has sublet the contract to six German manufacturers who make basic steel. It is expected that the Dominion Government will buy 50,000 tons more this year.

Furnace No. 3 Sydney.

Furnace No. 3 was blown in on the 19th inst. at the Sydney works of the Dominion Iron & Steel Company. It is 85 feet high and 12 feet in diameter in the crucible. It has a new kind of bosh protector, which is used in Canada for the first time. The furnace is particularly adapted for Belle Island ore and Sydney coke. The capacity is 200 tons of pig iron per day. It will be used solely for the manufacture of pig iron for the Canadian market. The other two furnaces will turn out material to be used in the company's steel works.

A New Steel Company.

Notice has been given that application will be made to the Dominion Parliament for the incorporation of a company to manufacture iron and steel at a point near the Welland Canal. The name of the company is to be The Steel Corporation of Canada. It is not the same concern as was incorporated some years ago to manufacture iron and steel in the town of Welland. As to the persons who are connected with the new venture financially nothing is yet known; but they may belong to the group who are in the Canadian Shipbuilding Company. The latter company are to put up large works at or near Welland. Several prominent Canadian capitalists are interested. The township of Bertie has recently voted a by-law making a fixed assessment of \$30,000 for the shipbuilding company. Frederick Nichols, the president, says that the machinery is all ordered and that shipbuilding will be begun next winter. The largest vessels are to be built.

C. A. C. J.

The Mahoning and Shenango Valleys.

A recent issue of *Industries*, published at Youngstown, Ohio, gives interesting statistics showing the importance of the Mahoning and Shenango valleys in the iron and steel and kindred trades. The valleys include the towns of Warren, Niles, Girard, Youngstown, Struthers, Lowellville, Hubbard, Wheatland, South Sharon, Sharon, Sharpsville, West Middlesex and New Castle. It is stated that the increasing importance of this district as an iron and steel manufacturing center led to many inquiries regarding the actual volume of business, and with a view of obtaining an accurate report of the consumption and production of the district, the co-operation of the manufacturers was secured and the statistics were obtained directly from them. The figures show the aggregate tonnage of raw materials consumed in the blast furnaces, rolling mills, steel plants, foundries, structural iron and plate works, together with the production of the various works of these valleys in 1902, as follows:

Blast Furnaces.

Production:	
Pig metal, tons.....	2,604,344
Stock on hand, tons.....	32,087
Receipts:	
Ore, gross tons.....	7,604,071
Cinder, gross tons.....	34,342
Coke, net tons.....	2,827,973
Slack and coal, net tons.....	205,476
Limestone, net tons.....	1,334,643
Sand, net tons.....	108,211
Total, tons.....	12,114,716

Foundry and Machine Work.

Production:	Tons.
General machinery and machine tools, engines, rolls, mill, steel plant, blast furnace machinery, stoves, ingot molds, &c.....	58,551
Gray iron, machinery, malleable, steel, semi-steel castings, used in construction at same plant and shipped	13,603
Total	72,154
Brass and bronze castings.....	994
Receipts:	
Pig metal.....	50,455

Plate Work and Construction.

Receipts:	
Plates and sheets, steel.....	30,805
Structural iron.....	148
Structural steel.....	10,703
Rivets	1,001
Castings	2,198
Total	44,855

Shafting.

Production:	
Finished shafting.....	7,939

Rolling Mills, Bessemer and Open Hearth Steel Plants.

Production:	
Muck bar.....	215,110
Skelp and plates.....	13,583
Billets	584,955
Tin bar.....	100,110
Sheet bar.....	265,259
Bars, iron and steel.....	423,229
Hoops, bands and cotton ties.....	147,232
Sheets, black and galvanized.....	86,223
Wire (barb and plain).....	54,816
Wire nails.....	739,639
Rails	325,000
Pipes and tubing.....	39,513
Ingot and blooms.....	1,599,699
Wire rods.....	77,316
Scrap	79,698
Tin plate.....	77,500
Total	4,828,882

Receipts:

Pig metal.....	372,886
Muck bar.....	6,474
Skelp	42,666
Billets	193,806
Sheet and tin bar.....	50,272
Scrap (iron and steel and old rails).....	116,917
Slack and coal.....	1,248,024
Bar iron and steel.....	12,106
Total	2,043,151

Patterns (lumber consumed)..... 490,051

Limestone, Brick, Clay, &c.

Production:	
Limestone	2,039,401
Brick (all kinds).....	88,705
Clay	13,726
Total	2,141,832

The above figures necessarily include, under the head of production, some items which subsequently enter into the tonnage of more highly finished products. This derogates from the value of the figures as pure statistics, but on the other hand, it perhaps cannot well be avoided, as the object of the statement is to show the total production of all establishments regardless of the fact that their output may go to other works in the district to be again counted in some other form.

The statement is made that this is the first time in the history of the valleys that so comprehensive an account of their industries has been published, and the work necessarily involved very considerable labor. The returns represent the figures given in the reports submitted to the stockholders of the several independent interests and directorates of the large consolidations, which were gathered after the close of the year's business.

Unfavorable Australian Iron Prospects.

MELBOURNE, February, 28, 1903.—The Royal Commission, the appointment of which we recently mentioned, sat at Melbourne about the middle of February, to inquire into the provisions of the bill relating to bonuses for the encouragement of the manufacture of iron within the commonwealth. Practically no additional evidence was produced beyond what has been reported in *The Iron Age* from time to time, unless we except the evidence of Henry Yorke Brown, the Government Geologist of South Australia. This gentleman stated that, while South Australia could, in his opinion, supply all the ore required here for centuries, he was not prepared to say what quality of iron the ore would make, and he would think it advisable not to smelt on the spot, but to ship the ore to a coal center. South Australia's lack of coal deposits certainly precludes the possibility of establishing works on any large scale within her borders. According to Mr. Brown the principal deposits of iron ore are those of the Iron Knob and the Iron Monarch, 40 miles west of Port Augusta, and the deposits at Port Victor, Quora, Kapunda, Mount Jagged and Burra.

The Iron Knob is at present being worked for flux by the Broken Hill Proprietary Company, and there is estimated to be 1,000,000 tons of ore in sight which averages 68.5 per cent. of iron, 2.3 per cent. silica and no phosphorus. The Iron Monarch is the capping of a hill rising 700 feet above the surrounding plain and is estimated to contain 20,000,000 tons of ore, an analysis showing 55 per cent. iron, 12½ per cent. manganese and 1.2 per cent. silica. These two certainly take rank among the largest deposits in Australia. There is abundance of limestone flux for smelting purposes along the adjoining shores of Spencer's Gulf, if the coal difficulty can be overcome.

The Commission has not yet finished its labors, but a forecast of its work will, in the general opinion, mean that although they may enthuse over the possibilities the future has in store, still the time is not yet ripe for the establishment of the industry. Economy must play first part, and economical production, under the existing state of the labor market, and under the present trend of labor legislation, is practically impossible on Australian soil.

The views of the other experts examined in Melbourne have previously been given in these pages. The Commission will sit again in Sydney in April, but whatever their report may be, the opinions expressed during 1902 are still held by your correspondent. Australia will find it a costly experiment to establish the industry on the "bonus" system.

National Association of Manufacturers.—A very strong effort is being made by the city of Pittsburgh to secure the next annual convention of the National Association of Manufacturers. When the association met in Indianapolis last year Pittsburgh made a bid for the convention, but New Orleans gave the convention such a strong invitation to meet there this year that Pittsburgh retired, with the understanding that New Orleans would work with Pittsburgh to have the next annual

convention in 1904 meet in the Iron City. In behalf of the Pittsburgh Chamber of Commerce A. J. Logan, president of that body, has addressed a letter to D. M. Parry of Indianapolis, president of the association, reminding the organization of its promise to come to Pittsburgh in 1904.

The Thiel Preliminary Refining Process for Steel.

O. Thiel, whose name is well known in connection with the Bertrand-Thiel process, describes, in a recent number of *Stahl und Eisen*, a new refining process which makes it possible to produce in a single reverberatory furnace any desired amount of semirefined metal, to be later handled in the usual way in the open hearth furnace or converter. This result he attains by means of continuous working, by heating the ore and lime used and by a peculiar new tapping arrangement. Continuous working in a stationary furnace by means of several tapping holes one above the other is an old suggestion, but has never proved practicable, as such holes cannot be kept in good shape, and this makes it impossible to tap the desired amount of metal each time. A tilting furnace, on the other hand, has the disadvantage that every time iron or slag is removed the source of heat must be shut off and the furnace is idle. The operation of tilting takes considerable time and the furnace and bath of metal are greatly cooled, not only on account of the gas being shut off, but also by the cold air drawn through.

Mr. Thiel overcomes the difficulty by the peculiar but simple form of tapping hole here described. In the furnace, either at the back or front or both, are built pockets, the outer walls of which are carried up slightly higher than the bath of metal and slag, and in these outer walls the actual tapping holes, both for metal and slag, are arranged (see Figs. 1 to 4). They are closed by means of large fire brick tiles, or, better, by doors lined with refractory material, which are dropped into place, the space behind them being quickly filled with similar material lightly stamped down, the whole operation taking only a minute. The bottom of the pocket offers an unchanging level, the height of which corresponds to the amount of metal to be tapped out. Figs. 1 and 2 show the hearth of a furnace of about 120 tons capacity, in the back wall of which there are, besides the usual tapping hole A^1 , four others, A^2 to A^5 , by means of which one-half of the metal can be removed. In Figs. 3 and 4 there are likewise, in a furnace of the same size, four tapping holes, which, however, are arranged in pairs in two pockets in the back wall, and in addition there are two tapping holes at the front. At each tapping hole there is a slag notch, S.

It will be seen that the bath of metal and slag is partly exposed in the projecting pocket, which, however, when working is closed by a cover. This open tapping hole has the great advantage that its condition can be observed at any time. A considerable advantage also results from the fact that it is possible to tap iron and slag from several holes at once without taking off the gas. Furthermore, opening and closing the hole takes place so quickly that still more time is saved for actual work, the charges follow each other in rapid succession and thereby the efficiency of the fuel is considerably increased.

The furnace is operated by never tapping more than half its contents at any one time, while to that remaining in the furnace an equal amount of molten pig iron is added; the whole is refined and again one-half is tapped. The advantage of the process consists of the fact that by mixture with the metal remaining in the furnace a high initial temperature is obtained. By now adding the necessary ore and lime in a heated condition the refining process is completed in one to one and one-half hours, while in the Bertrand-Thiel process the preliminary refining takes two to two and one-half hours. In the latter case the work is carried on under less favorable circumstances on account of the lower initial temperature and because the ore used is cold and often wet. Although heating the ore and lime helps to shorten

the process, the chief advantage of so doing is to be found in the more certain and regular operation which follows. Ore and lime can be added as soon as the metal is charged, and can be given in large doses without fearing any sudden cooling off of the bath.

The semirefined metal is, as mentioned above, generally finished in the converter or open hearth furnace, but considerable advantage can be obtained by carrying out the finishing as well as the preliminary refining by means of "continuous" working in a single furnace, using in this operation also the new tapping arrangement and heated ore. To obtain the benefits of continuous working it is, in this second operation, sufficient if one-third of the fluid metal remains in the furnace, so that for each charge two-thirds are tapped out. The temperature of the semirefined metal being very little lower than that of the metal which remains in the finishing furnace, it is impossible to perceptibly increase the initial temperature in the latter. The object of continuous working in this case is principally the attainment of rapid unhindered work, no time being lost repairing the hearth. The charge is finished in the usual way by means of ferromanganese, and, as the whole contents of the furnace are operated on, that part of the metal remaining in the furnace also undergoes this treatment. This proportion of the ferromanganese is

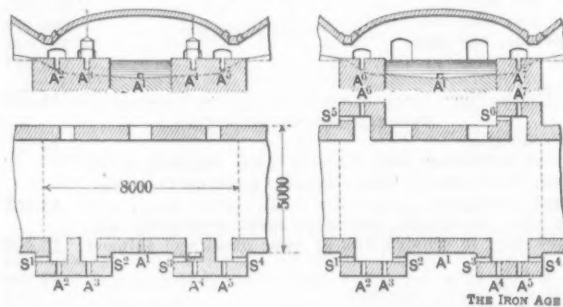


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

THE THIEL OPEN HEARTH FURNACE.

lost, at least to a great extent, and therefore continuous working is purchased at the price of 50 per cent. more manganese. This is compensated for by the fact that it only requires one instead of two finishing furnaces. Mr. Thiel remarks that no practical man would be content with finishing the charge in the ladle, but it is difficult to see why not.

It is possible with the process described above to take care of the product of any sized blast furnace by means of two reverberatory furnaces, converting the same to steel. To take care, for instance, of a daily product of 800 tons, a refining furnace of about 120 tons capacity would be necessary, which in 24 hours would handle 16 charges of 50 tons each. Presupposing the use of a rich Swedish magnetite, there would be about $11\frac{1}{2}$ tons necessary for oxidation, and this, with 3 tons of lime, would yield a slag with approximately 15 per cent. silica, 25.4 per cent. phosphoric acid, 37.2 per cent. lime and 8.7 per cent. ferrous oxide. The refined metal, of which about $53\frac{1}{2}$ tons would be obtained each charge, could be transferred to two or three open hearth furnaces and there finished in the usual way. If, instead of the open hearth furnaces, one finishing furnace with continuous working were used, the capacity of the same would have to be about 90 tons, and each charge would require 4 to 6 tons magnetite and 1000 pounds of lime. About 5 to 10 per cent. of scrap could also in this case be added. The finishing furnace could take care of 16 heats with an output of 107 to 108 per cent. This output is higher than with the Bertrand-Thiel process owing to the fact that by shortening the time 50 per cent. the oxidizing effect of the gases is correspondingly diminished whereby more ore is made necessary. The principal condition for success being rapid working, the time taken for tapping off slag and iron must be cut down as low as possible, and also that for

pouring in the metal, for which purpose several ladles should be used at once.

With ordinary pig iron some ore and lime can be charged in the first furnace while the iron is being poured in, the remainder being added in two or three portions in order that there may not be too strong a reaction or too much cooling off of the bath. In the finishing furnace these materials can be added still more rapidly, as the initial temperature is higher. Any kind of ore can be used, but if it is very siliceous it is perhaps well to form two slags in the refining furnace, first a siliceous one, in which is all the silicon from the pig, and then a basic one to take up the phosphorus. This is easily done, since the removal of the slag, by means of a large number of slag notches, occupies but little time.

Concerning the cost, Mr. Thiel estimates for Westphalian conditions that the new process is 5 marks (\$1.25) per ton cheaper than basic Bessemer. As mentioned above, the refining furnace can also be used as a preliminary for the latter process, and this procedure would be economical in districts where, by reason of the lack of high phosphorus ore, the production of cheap basic Bessemer pig is difficult. For this process the chief difference would consist of an acid lining in the refining furnace, in which the silicon would be completely removed, the carbon nearly so and the manganese to the extent of about 50 per cent., by means of heated ore. The refined metal, containing practically nothing but phosphorus, would be transferred to the converter and blown in the usual way. The advantage would lie in a blow shortened by about 60 per cent. and, on the other hand, the carbon of the pig would be utilized, which is not the case in the ordinary Bessemer process, since in the combustion of the same more heat is used than is produced. Furthermore, since the carbon requires more oxygen than all the other impurities put together, at least half of the fuel used in the production of the blast is burnt without any value obtained. This shortening of the blow has the further advantage that loss by radiation, &c., is correspondingly diminished. Furthermore, the refined metal coming very hot into the converter, comparatively little additional heat is required to keep the metal fluid until cast. The usual amount of phosphorus, 1.82 per cent., would be much too high for this process. The blows would go extremely hot, at least 10 to 20 per cent. of scrap would be necessary, and, the blow being so short, it would be necessary to add the same in the ladle before transferring the heat to the converter; 0.8 to 1 per cent. phosphorus in the iron would be quite sufficient to carry on the process. The utilization of the carbon referred to would be in the refining furnace, where it would be used to reduce iron ore, for which reaction heat from the fuel is also required. Compared with the usual basic Bessemer process, an output of 98 per cent. would be obtained and the cost (in Germany) would be approximately 4 marks (\$1) lower. The quality of the finished product would be much more regular, as the same would be independent of variations in the blast furnace, all differences of temperature and composition being equalized in the refining furnace. The quality would also be favorably influenced by the fact that, only 40 per cent. of the usual amount of air being blown through the same, the blow would be much more even and quieter and less material would be thrown out.

Such a preliminary refining for the Bessemer process would only be economically possible when a single refining furnace was used, and this in turn would only be made possible by the new tapping arrangement. Tilting furnaces would be, for reasons mentioned above, not practicable, because two of them would have to be used, thereby making the process too expensive.

A great advantage of this new arrangement of the tap hole is that the same can be built onto any existing furnace without great expense.

The customs convention recently adopted at an inter-colonial conference at Bloemfontein, South Africa, is understood to have the effect of admitting British goods at

a reduction of 25 per cent. on the ad valorem tariff. A special preferential tariff was arranged for mining and other machinery. Other British colonies can have the same benefit if they make reciprocity arrangements.

Notes from Mexico.

DURANGO, March 26, 1903.—Newspaper stories sent out from cities in the United States bordering on Mexico, purporting to reflect industrial conditions in this republic, should be received with the greatest caution. Most of them are exaggerated or inaccurate, and many are entirely without foundation. As an illustration may be mentioned a dispatch sent from El Paso, Texas, last week to leading United States papers, announcing the failure of some half-dozen business concerns in the City of Mexico, and predicting a financial panic. The report was both false and mendacious. There were no failures in the line of business indicated, nor was there any more uneasiness in financial circles than there has been since the silver question and its settlement became subjects of discussion several months ago.

El Paso appears to be the favorite breeding place of press falsehoods relating to Mexican affairs. So prolific is the town in this respect that all stories emanating from it treating upon matters south of the Rio Grande should be regarded as Munchausenish until confirmed from more trustworthy sources.

Failures in Mexico, even when they occur, which is seldom, are altogether lacking in sensational features and fraught with little danger to commercial interests in the concrete. The usual procedure in the case of an individual who finds that his business does not pay, and who therefore desires to get out of it, is to close his office or store, call in his creditors and pay them off to the last centavo, and then quietly retire to his private quarters. In this city there have been two failures in the past three years, and both were consummated in this fashion.

Industrial Notes.

Among recent tourists in the capital of Mexico was W. C. Magee, vice-president of the H. C. Frick Coke Company, of Pittsburgh.

One of the leading hardware houses in the City of Mexico has placed orders in Germany for material for tramways and for light railways to be laid down in plantations.

Large orders for machinery in mines in Santa Barbara and Varral, Chihuahua, have been placed in the United States, and are now being shipped. For the first five months of the fiscal year 1902-3 the imports into Mexico reached the total of \$30,191,989.46, gold, an increase of \$6,494,431.73 over the total for the corresponding period in the preceding fiscal year. The exports for the five months amounted to \$74,799,388.78, silver, an increase of \$13,836,337.51. Among the items which contributed to the total of the imports were: Machinery and apparatus, \$4,514,437.06, an increase of \$1,621,743.24; vehicles, \$599,973.26, an increase of \$179,130.46, and arms and explosives, \$650,160.10, an increase of \$171,850.27.

The Mexican Central Railway Company have ordered from the Pullman Palace Car Company 1050 steel body cars, and from the American Locomotive Company 25 consolidation, eight mogul, and two six-wheel switching locomotives.

In consequence of the high price of coal in the port of Tampico, a local journal notes the fact that certain steamers which formerly took bunkers there are now making side trips to Mobile for fuel.

The blast furnace of the Mexican National Iron & Steel Company of Durango, which has been in service for many years, has given out and will have to be relined. The company have made plans to build a new furnace of larger capacity upon the same site, but hoped to be able to keep the old furnace in blast for some months longer, in order to get a stock of pig iron ahead to supply their needs until their new furnace would be built and working. Being short of iron, and having many orders on hand, they will now reline the old furnace and run it some time longer.

J. J. D.

The Lapointe Adjustable Reamer and Support.

The body of the reamer made by the Lapointe Machine Tool Company of 35 Hartford street, Boston, is of cast iron, the blades being of tool steel, properly fitted in grooves, the angle of which is much greater than is usual in reamers of this type. This sharp angle prevents the blades from raising when being adjusted. It is not the object of the manufacturers to cheapen the reamer by the use of a cast iron body. They consider from their experience that a better friction can in this way be obtained for the blades, which makes a better seat for fitting the blades in the angles. They consider this the most accurate way for the blades to be adjusted, and much better than by screws or nuts. The back taper on the body of the reamer permits the chips to discharge more freely and prevents them from clogging between the blades. There is no obstruction in front of the reamer to prevent it from going to the bottom of the hole.

The tool support or reamer arbor shown in Fig. 2 is especially for use in turret machines. The holder and support relieve the weight of the reamer from the work by means of a spring on a taper pin, which pin also acts as a driver. The arbor is loose and is held in position against the rear wall of the bushing by means of a nut, which brings the pivoting points of the arbor near the center of the turret and overcomes in this way the difficulty that often arises in the locking mechanism of the turret.

A more or less common way of mounting reamers in

Scientific and Technical Notes.

The crank shaft of one of the large Rhine side wheel steamers was recently cracked close to the crank. The shaft at this point is about $13\frac{3}{4}$ inches in diameter, and was cracked nearly one-half across. The metal was chipped out at night, making a fissure about $1\frac{1}{4}$ inches wide for the entrance of what is known as "thermit" metal between the two faces of the crack. The mold had been prepared beforehand from a sketch, so that all was ready when the channel had been chipped out. The shaft was tightened down in its bearings and propped up to prevent deflection and imperfect alignment. The next morning a ring of thermit 2×4 inches was cast around the shaft, making a perfect union of the parts, the time required for the operation being about one minute. The steamer went on her regular trip the same day, with the shaft repaired, without experiencing any

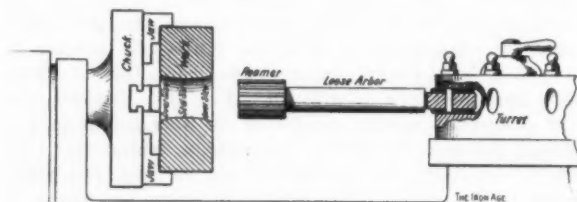


Fig. 3.—Ordinary Way of Mounting Reamer.

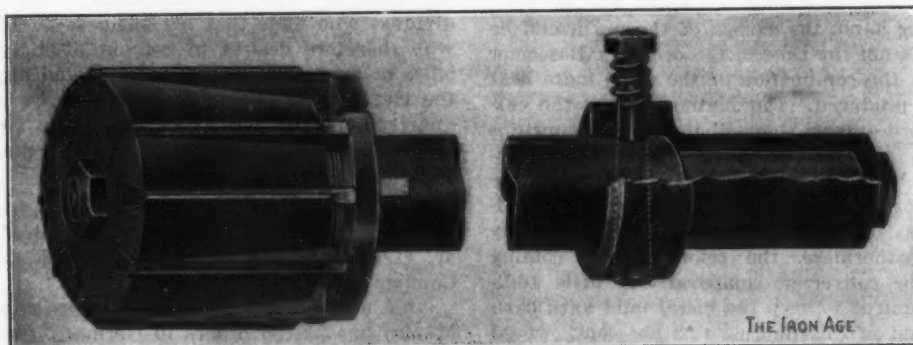


Fig. 1.—Adjustable Reamer.

Fig. 2.—Tool Support.

THE LAPOINTE ADJUSTABLE REAMER AND SUPPORT.

turret machines is shown in the sketch, Fig. 3. The end of the arbor is turned down to fit loosely in the bushing in the turret, and is prevented from turning by a pin. The free end is free to line up with the work, by which it is supported. The result is that the hole is not perfectly true, but flares in its outer portion, as indicated exaggeratedly by the drawing. In the present reamer this is obviated by a spiral spring on a taper pin passing through the bushing and having a nut for regulating the tension. In this manner the reamer is supported, so that it enters the hole in a true line. These reamers are made in sixteenths, from $1\frac{1}{4}$ to 6 inches.

Sewed Buffing Wheels.—The increase in demand among manufacturers for sewed piece buffing wheels has led the firm of F. L. & J. C. Codman, Boston, Mass., manufacturers of cotton and felt buffing wheels, to put upon the market a wheel of this style for cutting down and grinding purposes. The manufacturers claim to have overcome, in their Champlon and Victor sewed piece buffs, the faults heretofore common in sewed buffs, which are that the wheels were not balanced and that consequently when speeded up they tended to shake the lathe to pieces. Other faults that the manufacturers speak of as common to the old style of wheel are that the pieces have a tendency to fly out, and that the work tends to catch in the edge of a loose piece, thus causing considerable danger to the operator.

trouble from hot bearings or other causes. The amount of metal used was about 290 pounds.

"Big Ben," the famous clock in the tower of the House of Parliament, London, is regularly wound by hand, and it takes two men 12 hours each week to complete the operation. The English method is not in accordance with American ideals.

An English writer has recently described a modern battle ship as the "last word that mechanical genius, naval construction and cash payment can say in aggressiveness." From the fighting top to the double bottom, from ram to stern post, she is the most complicated machine the mind of man ever conceived. There is scarcely a trade or an art that is not represented in her building. She is a house that must be lighted, ventilated, drained and painted. She is a fort that must carry guns of heaviest calibers for fighting other battle ships; guns of medium size for piercing the comparatively thin protection of armored cruisers; scores of rapid firers for protecting herself against torpedo boats, and even a battery of small Colts for picking off sharp shooters or exposed men. Above all, she is also a ship to be taken to sea, to make passages from port to port and long ocean voyages. Moreover, she is a hostelry in which there are 700 men who must be clothed, fed and housed, and for whose use there is provided an ice plant having a capacity of 3 tons of ice per day, and evaporators that

daily produce 16,000 gallons of fresh water; there is also a bakery and an enormous kitchen. Besides the ponderous main engines of say 16,000 horse-power, there are perhaps nearly 100 auxiliary engines, or about the same number of electric motors. The boilers, with their 46,000 square feet of heating surface, must not be forgotten, nor the coal bunkers, which, in the "Oregon," for instance, have a capacity sufficient to steam that vessel a distance of 5500 miles without recoaling.

A contemporary states that zinc is a peculiar metal in many respects. It volatilizes easily, and the oxide thus produced has a strong affinity for carbon. If one's surface chimney is clogged up with soot and the owner desires to get rid of it, all that is necessary is to throw a little zinc scrap into the fire. Any old zinc will do, and very little will suffice to keep the chimney clean if used about once a week. The vapor of zinc oxide seizes upon the carbon of the soot and forms a new chemical compound, part of which goes up the flue, and part falls to the bottom, to be shoveled out as ash.

It has been suggested that plumbago packing rings of special design could be profitably employed in superheated steam engines, gas engines and other heat motors in which a high temperature is employed. Plumbago or graphite is unaffected by heat and is capable of being molded into permanent form suitable for packing rings, which are now uniformly made of metal. The chief expected advantage is the mirror like surface and polish that such rings would impart to a cylinder.

Placing in front of a locomotive a wind mill just the diameter of the boiler, and just covering the front end of it, cannot add much to the air resistance, yet this device on a train running at 45 miles an hour is said to have developed 4.5 kw., or 6 horse-power, which was applied to charging a battery for lighting the train. This looks like "picking up quite a chunk of hitherto wasted energy."

The census report on the construction of motive power machinery in America gives data on the cost of equipment of power plants. In 1900 fire tube boilers cost \$9.28 per horse-power, while water tube boilers averaged only \$7.73, the difference being partly due to the fact that the latter type was built in larger units. For steam engines the prices for the types of plain slide valve, high speed automatic and low speed automatic are respectively \$12.11, \$10.43 and \$11.59 per horse-power. The small size of the internal combustion motors brings their cost up \$33.88 per horse-power, but as such engines have only one power stroke in every four, they are necessarily larger than steam engines of the same power. Since they do not require any steam generator, however, they may be compared with the cost of both engine and boiler, in considering the installation cost of a power plant. The total output for the year 1900 was primary power machinery representing a total of 2,743,325 horse-power, with a value of \$35,120,218, or \$12.80 average per horse-power. This includes neither locomotives nor motor vehicles, but does include marine machinery. Of the total more than 2,000,000 horse-power was represented in 29,120 steam engines, which averaged about 70 horse-power each. The steam boiler output numbered 40,533, with a total of nearly 3,000,000 horse-power, or somewhat under 75 horse-power each, on the average. The triple expansion engine, while holding its own in marine practice, has been generally superseded in stationary practice by the compound engine, with cylinder ratios of larger values than formerly, ranging from one to four up to one to seven, the latter proportion being practically the same as that exhibited in most triple expansion engines. The steam economy is almost the same in the two cases, while the great relative simplicity in construction and operation of the compound engine militates largely to its advantage for the general sort of work demanded of it.

The British Westinghouse Company have introduced a feature new in Great Britain, in receiving apprentices in their shops without premiums, and, moreover, paying

them wages from the commencement of their time. Each candidate is examined as to his technical and general knowledge, and is drafted into either the "college" or the "school" course, according to his ability. The former extends over three years and embraces rather more advanced work than the latter, which covers four years. Apprentices are permitted to enter in succession nearly all the different departments during the three or four years covered.

The University of Michigan is erecting a new engineering building at a cost of \$140,000. Among the more important features of the building and its equipment will be a naval testing tank, a compressed air room, a hydraulic laboratory, a cold storage department and steam engine and electric rooms. The tank for testing ship models is 300 feet long, 22 feet wide and 10 feet deep. It has connected with it a dry dock large enough to hold a model 10 feet long. The air compressors in the compressed air laboratory will be capable of delivering air at pressures as high as 3000 pounds per square inch.

A mechanical oil cup which comprises a small ratchet driven oil pump for use in connection with the oil cup to secure positive mechanical lubrication has recently been placed upon the market. To the ratchet mechanism is directly attached a crank pin device which actuates the piston of the pump, and the ratchet clutches are operated by a rod, which can be connected to the eccentric rod or other moving parts of the engine by an arrangement to change the stroke of the pump, and consequently the amount of lubrication, as desired.

It has been discovered in Germany that aluminum is valuable in sharpening cutlery. The metal apparently has the structure of a fine stone and possesses a good dissolving power. It moreover develops during the whetting process an exceedingly fine metal setting substance, greasy to touch, while showing strong adhesion for steel. The knives in a short time obtain such a razor like edge that it is said that even the best whetstone cannot compete with the result.

Alcohol motors are much used in Germany, especially for automobile purposes, the fluid, 90 per cent. pure, being sold at about 5 cents per quart. The motors have all the advantages of cleanliness, ease of starting and stopping, and the weight is only about one-half that of a portable steam engine of equal power. Six to 8 horse-power motors are sold at about \$140 per horse-power, 10 to 12 for about \$115, and 16 to 20 for about \$90 per unit of power. Tests seem to indicate an average consumption per brake horse-power per hour of about 0.92 pound of 86 per cent. spirit, and about 0.81 pound of a mixture of one-fifth benzol and four-fifths 86 per cent. spirit.

One thing for which Great Britain is noted, and which is often urged against her as a reason for a certain backwardness one hears a good deal of at times, is the absence of overhead wires for power purposes, with a consequent increase in the cost of transmission. This is a matter over which the Board of Trade has full control, and it is often overlooked that in certain instances the board may, and does, give permission to use overhead wires, provided satisfactory proof is given as to their safety. A recent instance of this action on their part has occurred at St. Helens, Lancashire, where overhead wires carrying current at 500 volts have been sanctioned for supplying power to some chemical works. The conditions imposed provide that the erection be carried out in a proper manner, and that the line be kept under constant inspection.

A very elaborate programme has been arranged for the third general meeting of the American Electrochemical Society, to be held at New York on April 16, 17 and 18. The local arrangements are in the hands of Alois von Isakovics, 449 East 121st street, New York. Over 20 papers will be read and discussed.

A Novel Tunnel Under the Thames.

London has recently completed a novel tunnel under the Thames, which is to be used exclusively for foot passengers. The object is to permit the workmen on the docks in the Isle of Docks district on the Millwall side to reach their houses at Greenwich without paying a fare to the companies who have for the past two centuries enjoyed the monopoly of ferry transportation across the river. The character of the ground is such that it was impossible to make a gradual approach, so that two electric elevators were installed at either end

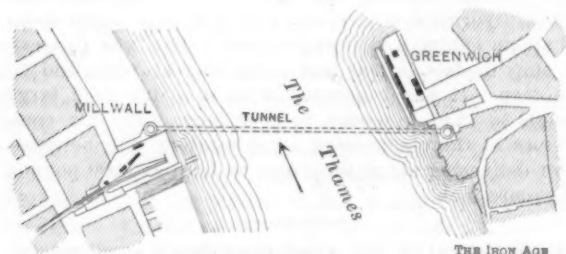


Fig. 1.—The Millwall-Greenwich Tunnel.

of the tunnel. This has made it impossible to send through it vehicles. However, the drawback is not serious, since the Blackwall Tunnel is quite near, and since it is proposed to build a tunnel at Rotherhithe.

The *Genie Civil* gives the following details in regard to the new tunnel: It is practically horizontal, and is about 371 m. long, being connected with the streets by two circular shafts, the depth of which is respectively 44 and 57.4 feet. The section of the tunnel itself is circular, as is that of the shafts. It has a cast iron lining, with an exterior diameter of 12.70 feet, the lining of the shafts having a diameter of 44 feet. The central part of each shaft is occupied by an electric elevator surrounded by a stairway. The shafts are lighted with electric light, and are lined with enameled brick, the ventilation being excellent. The shafts are surmounted by two close domes. The shafts were sunk in the same manner and form a circular steel caisson, the exterior diameter being 43 feet and the interior diameter 35.1

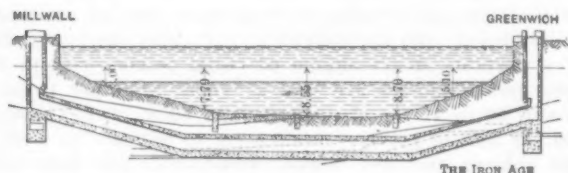


Fig. 2.—Longitudinal Section of Tunnel.

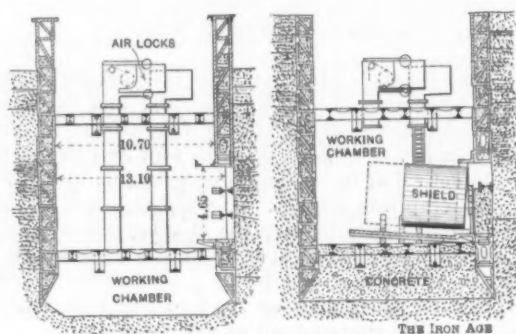
feet. The intervening space is filled with Portland cement. The caissons are formed of horizontal rings 5.67 feet high, the thickness of the plates varying with the depth from 0.32 to 0.6 inch. The lower part of the caisson is in the form of a knife edge reinforced by a ring of steel having a thickness of 0.71 inch. Each of the caissons has two tight bulkheads situated above and below the entrance of the tunnel proper. The lower bulkhead, which was not absolutely necessary, was put in to lower the center of gravity of the caisson in order to secure an exactly vertical position.

The tunnel proper is lined with cast iron sections having an exterior diameter of 12.75 feet and an interior diameter of 11.75 feet, each ring being 2 inches high and being formed of eight equal segments, and a ninth constituting a key section.

The working chamber which was utilized for driving the tunnel had a total length of 20 feet and an exterior diameter of 13 feet. Its cutting edge was composed of 13 segments, each provided with two 6-inch teeth. Ample provisions were made for properly strengthening the cutting edge. Behind the same was a diaphragm covering the entire upper part of the working chamber and being carried down through 14 inches below the

horizontal axis. The rest of the opening was covered by a movable shield of steel. Attached to the forward diaphragm were two hydraulic jacks. The rear jacks, and which were used for forcing the shield forward, were 13 in number, and could exert a power of 750 tons.

The first work was begun on the Millwall side, the



Figs. 3 and 4.—Sinking the Caissons.

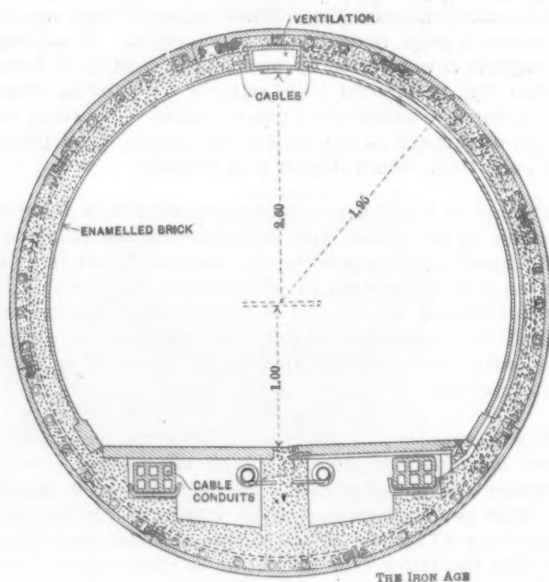
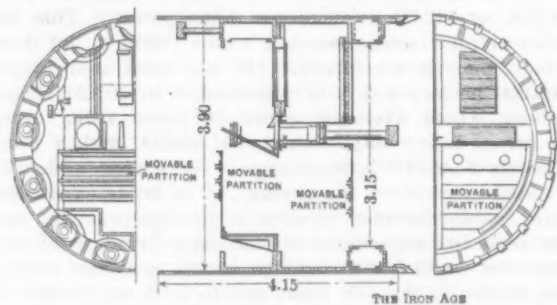


Fig. 5.—Cross Section of Tunnel Lining.

caisson having been completed in September, 1899. In March, 1900, the first half was completed. At this point water became abundant, and compressed air had to be resorted to. In May, 1902, work was resumed.

The weight of the caisson and 921 tons of additional weight figured up to 2560 tons. After a month of work with compressed air the caisson occupied its final position. The driving of the tunnel was carried through



Figs. 6, 7 and 8.—Rear Elevation, Longitudinal Section and Front View.

throughout with compressed air. Great precautions were taken to avoid accidents, but in spite of this there was a fire, which lasted for 48 hours. Work was carried through in shifts of eight hours, with a 45-minute rest, during which the men were not permitted to remain in the tunnel. The quantity of pure air forced into the

interior of the tunnel was never less than 115 c. m. per man per hour, but on an average was 140 c. m.

It will be seen from the section of the tunnel that special ventilation has been provided for and that cable conduits have their space.

February Imports and Exports.

The detailed statement is at hand, issued by the Bureau of Statistics of the Treasury Department, relative to imports and exports for February. The statistics show a continuance of heavy imports of iron and steel and a comparatively light export movement of the same commodities. It appears, however, on an examination of the statistics of imports that our receipts from abroad during February were only a little more than half those of January, taking the articles for which weights are given. The total for January was 184,100 gross tons, while the figures for February are 97,908 tons. The export movement also showed a favorable turn, the February figures being slightly in excess of those of January.

Taking the commodities for which the weight is given, the following table shows the imports of iron and steel for the month of February of this year as compared with the same month of last year, the tons used being tons of 2240 pounds:

Imports of Iron and Steel.

Commodities.	February,	
	1903.	1902.
	Tons.	Tons.
Pig iron.....	45,187	8,307
Scrap.....	4,250	750
Bar iron.....	2,646	2,277
Rails.....	19,804	346
Hoop, band or scroll.....	117	30
Billets, slabs, bars, &c., steel in forms n.e.s.....	20,151	2,235
Sheets and plates.....	206	973
Tin plates andterne plates.....	4,026	6,217
Wire rods.....	1,224	828
Wire and articles made from.....	252	236
Chains.....	45	8
Totals.....	97,908	22,207

The table above shows that our importations of tin plates are being held down remarkably, as the imports during February of this year were 33 1-3 per cent. less than those of the corresponding month of last year. This is probably due to our mills securing much more of the drawback plate business under the special arrangements with workmen and dealers in supplies. They further show a reduction on the importations of January, which amounted to 5298 tons.

The exports, also taking the commodities for which weight is given, were as follows:

Exports of Iron and Steel.

Commodities.	February,	
	1903.	1902.
	Tons.	Tons.
Pig iron.....	876	2,463
Scrap.....	197	1,328
Bar iron.....	267	386
Wire rods.....	1,416	159
Steel bars.....	3,671	1,076
Billets, ingots, blooms.....	317	88
Hoop, band and scroll.....	96	133
Iron rails.....	357	4
Steel rails.....	168	6,202
Iron sheets and plates.....	102	282
Steel sheets and plates.....	808	307
Tin plates andterne plates.....	25	215
Structural iron and steel.....	3,114	10,081
Wire.....	7,646	7,446
Cut nails.....	775	498
Wire nails.....	1,765	1,677
All other nails, including tacks.....	127	206
Totals.....	21,727	32,551

This table shows a number of interesting changes. It is especially notable with regard to the increase in the exports of wire rods, steel bars, steel sheets and plates and wire. Wire rods jumped from 159 tons in February of last year to 1416 tons in February of this year. Steel bars show more than three times the quantity exported in February of last year. These items also show a heavy gain on the exports in January. It was to be expected that the exports of structural iron and

steel for February would fall much below those of February of last year, but it is interesting to note that they show a gain on the exports of the same commodities in January. Our exports of steel rails have fallen to insignificant figures, but it is interesting to observe that some demand abroad exists for iron rails, which were exported to the extent of 357 tons in February.

Our imports of iron ore in February were only 64,378 gross tons, against 73,506 tons in the corresponding month of the previous year. For the eight months ending with February the total was 715,828 tons, against 745,364 tons for the corresponding period of the previous year. These figures are somewhat surprising, as it had been expected that our importations of iron ore were increasing. This may prove to be the case a little later in the year, owing to the higher prices now asked for lake ores, which will undoubtedly cause furnace companies along the seaboard to secure an increased part of their ore supplies from abroad.

The total importations of iron and steel, except ore, were valued at \$3,312,074 in February, against \$1,768,305 in February of last year. For the eight months ending with February the total importations were valued at \$34,558,054, as compared with \$15,727,934 for the corresponding period of the previous year. The February exports of iron and steel, except ore, reached a total value of \$6,923,205, against \$7,365,395 in February of last year. For the eight months ending February the total was \$62,921,147, as compared with \$64,675,523 in the corresponding period of last year. These figures show but a slight falling off, indicating that the exports of highly finished products are keeping up very well. If the figures of the corresponding period of the fiscal year 1901 are taken into consideration a very heavy reduction in our exports is shown, as in that period the total was \$81,575,685.

Hickman, Williams & Co.'s Growth.

Hickman, Williams & Co., pig iron and coke, have recently leased additional offices in The Rookery, Chicago, and announce the opening of an office at Pittsburgh, in the German National Bank Building, under the management of George S. Griscom, Jr. The changes have been made necessary by the rapid growth in the volume of their business. The firm of Hickman, Williams & Co. were established at Louisville, Ky., in 1891, where Baylor Hickman is still located. The Chicago office was opened in June, 1898; by H. L. Williams, who continues to make Chicago his headquarters, ably assisted by E. P. Het-tiger. The St. Louis office was opened in 1900 by Ben P. Williams, who is now manager at that point. In February this year Frank M. Eaton was admitted to partnership, opening an office at Cincinnati, Ohio. The latest evidence of growth is the opening of the Pittsburgh office above referred to.

Hickman, Williams & Co. own a half interest in the Red River Furnace Company, operating the Helen Furnace at Clarksville, Tenn., and in the Dover Iron Company, operating the Bear Springs Furnace at Bear Springs, Tenn. Two years ago the firm secured the agency of the Virginia Iron, Coal & Coke Company for the sale of coke pig iron at Chicago and Louisville. They now represent the company at Pittsburgh and in all the territory west of the Allegheny Mountains. In addition they are agents at Chicago, Louisville and the country tributary for the Trussville iron, manufactured by the Lacey-Buek Iron Company at Trussville, Ala.; the Vanderbilt iron, manufactured by the Tutwiler Coal, Coke & Iron Company, Birmingham, Ala.; the Warner iron, product of the Cumberland furnace, manufactured by the Warner Iron Company, Cumberland, Tenn.; at Louisville, Chicago and St. Louis for the Standard iron manufactured by the Standard Iron Company, Goodrich, Tenn.; at Louisville and St. Louis, for Woodward iron manufactured by the Woodward Iron Company, Woodward, Ala.

Ch. Bettendorf & Co., Bruxelles, Belgium, importers of iron and manganese ores and of magnesite, have decided to close their New York office.

The Iron Age

New York, Thursday, April 2, 1903.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	-	-	-	-	EDITOR.
GEO. W. COPE,	-	-	-	-	-	-	-	-	-	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	-	-	-	-	-	-	-	-	-	HARDWARE EDITOR.
JOHN S. KING,	-	-	-	-	-	-	-	-	-	BUSINESS MANAGER.

Some Interesting Labor Developments.

The evidence accumulates that henceforward the professional labor organizer will find his occupation one of increasing difficulty and embarrassment. Up to now it has been relatively easy, and, generally speaking, more profitable for those skilled in labor politics than working for wages. Many trades have offered virgin fields for effort in organization, and since the ground was fairly covered the opportunity for profitable industry has been found in nationalizing the movement by bringing all trade unions under the control of district central committees and affiliating these, in turn, with organizations of wider scope tributary to the organizations which are supposed to look after the general interests of all labor everywhere, irrespective of trade distinctions. This plan has been an evolution, and that it was devised and carried out shows that the labor movement has some efficient organizers and capable managers. If consistent with the purpose of this article it could be shown that the movement had its beginnings and owes its development to a natural and proper desire on the part of labor to better its condition and emancipate itself, as far as possible, from conditions inimical to the best interests of the body politic. It might also be shown that the strikes, excesses and mistakes of organized labor represent the struggles of a blind giant to feel its strength and free itself from bondage; that with experience will come a larger wisdom, and that the net result of the present struggle will be substantial progress toward a higher, better and more uniformly developed civilization. This, however, may profitably be left to the student of social science. The practical aspects of the subject have more immediate interest for the man of affairs, and especially for the employer of labor, who is likely to find a blow from a blind giant as grievous as one from a giant who can see and knows what he is hitting at.

Organized labor seems to be a great deal stronger than it really is. It has never succeeded in affiliating a large proportion of the wage earners of the United States, and of those claimed as enrolled in its membership the percentage in sympathy with the aggressive policy which characterizes its present typical attitude is doubtless very small. A coherent, well organized and unscrupulous minority, led by men who have a relatively large personal interest at stake, can do immeasurable mischief. This was forcibly illustrated in Waterbury, as it has been in many other industrial centers. It is difficult to say where this ability of the relatively few to dominate the relatively many would have ultimately led if out of the intolerance, excesses and crimes committed in the name of labor had not grown counter movements which promise to re-establish equilibrium and make it increasingly difficult for the professional agitators, organizers and leaders in disorder to accomplish the ends they have had in view, and toward which it must be admitted they have seemed to be making rapid and irresistible progress.

It has been expected that the conditions were shaping which would lead to a revolt of labor against the dictation and oppression which the more aggressive trade unions have employed to discourage and punish independence of thought and action. It has long been realized that individual effort, whether of the employer or of the wage earner, was powerless to offer effective resistance to the demands of organized labor, however unreasonable or oppressive. The first step in the direction of the equalization of conditions was, naturally, the formation of employers' unions. Of these there are now many, some of them too strong to be trifled with, and all effective in promoting the mobilization of resources for the defense of any weak point selected for attack. They have demonstrated their usefulness, and it is creditable to their membership that those which are really strong have employed their strength discreetly, and have in no instance taken advantage of it to oppress labor or sustain an employer who, on an investigation of his position and of the issues between himself and his workmen, was found to be in the wrong. Obviously, however, such associations of employers cannot undertake an altruistic crusade for the protection of nonunion labor against union labor, except as both may appear upon the pay rolls of the affiliated establishments. There is a great deal outside of what the associated employers can do to protect independent labor, which it must do for itself or suffer oppression and persecution. That it would ultimately see this and seek strength for mutual protection in organization on lines consistent with manhood and citizenship was expected; that the movement in this direction has begun is of unusual interest to all who find the struggle of labor toward higher standards a matter of concern.

Indiana appears to have taken the lead. Under the laws of that State there has been incorporated a society known as the Independent American Mechanics' Union, with headquarters in Anderson, Muncie and other local industrial centers. We confess that when the announcement of the formation of this society appeared we were somewhat skeptical as to its origin. Having inquired in reliable quarters, we are assured that it is a *bona fide* workingman's movement, originated by workmen themselves. Its immediate objects, as declared in its articles of incorporation, are as follows:

"This association shall encourage industry, economy, thrift and honesty among its members; maintain amicable relations between employees and employers of labor; assist its members in obtaining the highest wages consistent with the general good of all concerned; promote all forms of productive industry and increase the employment of labor at good wages; prevent unjust and unreasonable discrimination against any of its members by any person, combination, or conspiracy to prevent such members from securing employment in any branch of industry, and protect and defend its members against any and all attempts by any person or combination of persons to abridge the inalienable right of all mankind to work for such wages as shall be mutually satisfactory to the individual workman and his employer."

The individual wage earner who should accept and proclaim this as his creed would do well to take to the woods. The partisans of the trade unions would quickly silence him on the specious plea that the individual wage earner has no right to act or think independently of union dictation. At the late meeting of the Industrial Committee of the National Civic Federation in New York, Samuel Gompers, president of the National Federation of Labor, in an address denounced the attitude of nonunion workmen in every trade. But when a great

many workmen combine to assert and defend the right of the individual to resist oppression and make his own contracts, this argument, however fallacious, loses what little plausibility it may have had. They have the same right to collective decision and action that others have who think differently.

The Muncie union, which is affiliated with that at Anderson, has adopted a constitution which declares against strikes as a means of settling disputes between employers and workmen, denounces the boycott as un-American and destructive of peace and social order, opposes "unfair lists" as employed by organized labor, and declares in favor of grading mechanics according to their industry and capacity. An interesting incident of the Muncie revolt against union oppression is the beginning of a civil suit against the local Building Trades Council, claiming damages in \$5000. Some time ago the Hodecarriers' Union of that place was ordered on a sympathetic strike to sustain a demand of the carpenters. Such a strike took place, and as the result a number of hodecarriers who did not want to strike and had no reason for doing so were rendered idle against their will. Their suit for damages is in consequence of loss of wages. This presents the responsibility of those who assume to speak and act for labor in quite a new light, and is one of the most interesting of recent phases of the labor movement in this country.

Such a revolt against trade union tyranny has been long expected by those who have been in touch with labor and have known of the growing discontent of those who have been held in more or less forcible subjection to arbitrary authority by self constituted and irresponsible dictators of union policies. The unions which for years have been the storm centers of agitation and disturbance are the ones which have most reason to fear the beginnings of a movement such as has taken shape in Indiana. Its success depends very largely upon the intelligent co-operation of employers.

Reminiscent of March Days.

One year ago this week all kinds of material were in heavy demand and scarcity was developing in so many lines that fears of a runaway market were entertained by conservative manufacturers, who desired the prices then ruling to be maintained. Bessemer pig iron was selling at \$17.50, Pittsburgh, and No. 2 Southern foundry at \$15, Cincinnati.

Five years ago the prospect of a war with Spain was depressing trade and the suspense was causing all projected improvements to be postponed. American rail manufacturers were actively seeking business abroad and were then bidding on the great Siberian order. Bessemer pig iron was selling at \$10.60, Pittsburgh, and No. 2 Southern foundry at \$9, Cincinnati.

Ten years ago business was distinctly in the dumps, great eagerness for orders being shown by manufacturers. Billets were well held, but foundry pig iron was being pressed for sale by numerous makers. The conditions were just such as would be presumed to characterize trade on the eve of the financial disturbances and trade depression destined to come a little later in the year. Bessemer pig iron was selling at \$14, Pittsburgh, and No. 2 Southern foundry at \$12, Cincinnati.

Twenty years ago trade was very dull and owners of blast furnaces were blowing out in apparent concert in the hope of arresting the decline then in progress. Bessemer pig iron was selling at \$22.50, Pittsburgh, and

steel rails at \$39, Eastern mill. Charcoal pig iron was supreme in the Cincinnati market, selling at \$22 for Alabama brands and \$25.50 for Hanging Rock, but Southern coke No. 1 was working its way into favor at \$21.

Thirty years ago, in the memorable year 1873, money was tight and great difficulty was experienced in making collections. This was the only unfavorable feature of the market at this time in the spring. No other indication appeared which would cause business men to suspect the financial catastrophe destined to occur in the autumn of that year. The market was quiet in pig iron, but finished iron was in fair demand. At that time Bessemer pig iron had not begun to be conspicuous in the market. Forge pig iron was the leader, and red short was quoted at Pittsburgh at \$43. Iron rails were quoted at \$80 currency for American at mill and \$70 gold for English at the seaboard. The premium on gold at that time was 16 per cent., as this country was then suffering from a depreciated currency. Scotch pig iron was widely used by foundrymen and Eglinton was quoted at \$54, New York, and \$60, Chicago. In the Ohio River district Louisville was the prominent pig iron market and charcoal foundry iron was in leading demand, being quoted at \$54 to \$56, while coke or "stone coal" iron, as it was then called, made from Missouri ores, was selling at \$54. It is interesting to note that the market reports at that time spoke of English steel rail mills being run on American orders. American steel rails were beginning to get part of the trade and were selling at \$122.50 in currency at Eastern mills. American tool steel was stated to be beginning to take the place of foreign. Bar iron was quoted at Pittsburgh at 4 cents a pound and cut nails at \$5 a keg.

The Texas Oil Fields.

Writing under date of February 14, 1903, to the American Institute of Mining Engineers, Robert T. Hill of the United States Geological Survey, Washington, summarizes as follows the events of the past year in the new oil fields:

Jennings, Louisiana, and Sour Lake and Saratoga, Texas, have become productive fields. Oil is also reported in commercial quantities from several other localities. The wells of Spindle Top Hill, on the other hand, have mostly ceased to flow, and are now pumped, a result which was naturally to have been expected from the drilling of nearly 300 wells within a limited space of 150 acres. All in all, the development of the field has been satisfactory; and it is safe to say that the Beaumont oil field, as a whole, notwithstanding the hundreds of experimental failures, has developed as rapidly as any other field ever discovered, and it is reasonable to expect that new localities will be found as years roll by.

The use of the crude oil has steadily increased until this material, which, at the time of its discovery, was pronounced to be unfit for any purpose, is now refined, and sells for as high as 60 to 70 cents a barrel. All of the railways of Texas are using oil, and the Southern Pacific Railway has recently purchased the entire Saratoga fields, and runs its engines from the Atlantic to the Pacific with the Texas material. The legitimate investors have made money and the honest companies are paying dividends. The field has subsided from the condition of frenzied excitement and "wildcat" speculation which marked the first days of its discovery, and has settled down to one of systematic business organization and production. Pipe lines, refineries and tank cars are now in great abundance. The statistics are not available for the production of the whole field, but the following, taken from the *Engineering and Mining Journal* for February 7, 1903, shows the production of Spindle Top Hill for 1902:

Shipments, January 1 to June 30, 3,768,000 barrels;

July, 850,000; August, 915,000; September, 828,815; October, 916,979; November, 844,791; December, 1,004,569; total shipments of 1902, 9,128,154 barrels; local consumption, 500,000 barrels; waste, 1902, 400,000 barrels. Increased oil in store over December 31, 6,105,000 barrels; total production of 1902, 16,133,154 barrels.

Total production of 1901, 4,190,000 barrels.

Total production of field, 20,323,154 barrels.

Iron tankage completed, 7,280,000 barrels; earthen reservoirs completed, 7,100,000 barrels; total tankage, 14,380,000 barrels.

Oil in store December 31, 1902, 7,105,000 barrels; prices for crude in 1902 varied from 2 cents to 50 cents a barrel in tanks.

Scotch Industries.

Labor Troubles Subsiding.

GLASGOW, March 20, 1903.—Two wage settlements within the last week or two have had a soothing effect on the industrial situation. The Scotch miners had passed resolutions to go out on strike in support of the Welsh miners, if the latter struck. As there is to be no disturbance in Wales there will be none in Scotland. Meanwhile, coal is in reduced demand and declining in price, which affords some comfort to industrial consumers.

The other settlement is the last of the questions open in the general rearrangement of wages in the shipbuilding industry. The machinists (called here engineers) did not accept the proposal of the employers to take 5 per cent. off wages, the same as in the case of the ship yard workers, but claimed reference to a conference of the executive committees of the Employers' Federation and of the Allied Trade Unions. This conference has just decided to recommend the men to accept a reduction of 1 shilling per week on time rates, and 5 per cent. on piece rates, and to recommend the employers not to put the reduction in effect until May 1, as all the branches of engineering are not equally depressed. This gives the machinists a couple of months longer at the old wages than the employers intended, but it is a great thing that peace is preserved. The prospect in the ship yards, however, is not improving, for while wages are down, material is up. Steel ship plates are this week advanced to £6, less 5 per cent.

Renewal of Pig Iron Buying.

After a lull has come this week a renewal of buying in the pig iron warrant market. It has not been on so large a scale as before, but has restored the loss in prices, which, as I write, are 57 shillings 6 pence for Scotch, 52 shillings 9 pence for Cleveland, and 61 shillings 9 pence for Cumberland hematite. Practically all the dealing is confined to Cleveland warrants, and a good deal of it is due to the excitement in the metal markets caused by the large advance in copper. At all events I cannot find that consumers are buying more iron than they are compelled to do, and the American orders are not now conspicuous either in number or size. One hears a good deal about the improving position in Germany, and Germany has certainly begun to buy more British pig iron than she has been taking for some time past; but there is a suspicion that the reported improvement in Germany is merely a temporary depletion caused by the large orders from America for German iron and steel.

In any case the run upon Cleveland warrants and the export orders for iron have given a rather more cheerful tone to the Middlesbrough market, where No. 1 is now quoted 54 shillings, No. 4 foundry 51 shillings, gray forge 48 shillings 6 pence, mottled 48 shillings, and white 47 shillings 6 pence. Middlesbrough hematite has come into strong demand, but at 57 shillings 9 pence for mixed numbers, 58 shillings 3 pence for No. 1 and 53 shillings 6 pence for No. 4, prices are relatively lower than ordinary and (so smelters say) not commensurate with the cost of production, with Spanish Rubio ore at 16 shillings 6 pence.

The shipments from the Tees so far are about 20,000 tons, and those from the Clyde, &c., about 15,000 tons ahead of last year. The quantity coming from Cleveland to Scotland is also up by several thousand tons, notwithstanding the high price. For Scotch brands the current

quotations are: Coltness, No. 1, 71 shillings 6 pence; No. 3, 60 shillings; Gartsherrie, No. 1, 65 shillings 6 pence; No. 3, 59 shillings; Summerlee, No. 1, 68 shillings 6 pence; No. 3, 59 shillings; Clyde, No. 1, 65 shillings; No. 3, 58 shillings 6 pence; Carnbroe, No. 1, 59 shillings 6 pence; No. 3, 57 shillings 6 pence; Eglinton, No. 1, 59 shillings 6 pence; No. 3, 56 shillings 6 pence; Dalmellington, No. 1, 59 shillings 6 pence; No. 3, 56 shillings.

The Scotch Locomotive Consolidation.

The combine of Scotch locomotive builders have been registered as the North British Locomotive Company, Limited, with a capital of £2,000,000, in 100,000 5 per cent. cumulative preference shares of £10 each, and 100,000 ordinary shares of £10 each. All the ordinary shares are paid to the vendors in part payment of the purchase price, and also 2000 of the preference shares. The vendors are also to be allotted on subscription 23,000 of the preference shares; 50,000 were offered for public subscription, and the rest are held in reserve. The works are all in running order and capable of producing 600 locomotives per annum. Extensions are in progress for increasing the output, and for increasing standardization. Nothing is paid for good will or current contracts. The prices paid to the vendors for sites of works, erections, plant and machinery (but not stocks or material) are £466,316 to Neilson, Read & Co., £313,684 to Dubs & Co., and £240,000 to Sharp, Stewart & Co. The tenders for the £500,000 worth of preference shares amounted in a few hours to £7,000,000 sterling.

A Ship Canal Asked Across Scotland.

One of our district Members of Parliament, James Caldwell, has been pressing on the House of Commons the advantages of Scotland from a naval point of view and the desirability of a ship canal between the Clyde and the Forth. Scotland has excellent harbor accommodations both on the east and on the west coasts, and the Clyde, with its shipbuilding, its supply of workmen, and its proximity to the coal and iron fields, is pre-eminently suitable for a Government dock yard. It is true that the new naval base at St. Margaret's Hope on the Forth will to a large extent mitigate the grievance so far as the east coast of Scotland is concerned. It will provide a Government dock yard in proximity to the coal and iron industries, and an excellent harbor for a fleet of any size watching and protecting the harbors and ports and shipping on the east coast, but under existing circumstances it would not help the harbor and shipping interests on the west of Scotland in the event of war.

The whole complexion of the matter would be changed by the formation of a canal between the Forth and the Clyde, which would enable ships of war to pass freely from one coast to the other. Such a canal would be only 30 miles in length, and capable of being traversed in from five to six hours. By its means the naval base at St. Margaret's Hope on the east coast would be in direct water communication with a fleet operating on the west coast, and also in direct communication with the shipbuilding yards on the Clyde and in the north of Ireland. There would also be no chance of a fleet being hopelessly blockaded at St. Margaret's Hope—in fact, the importance of such a canal from a national defense point of view is obvious. The existing barge canal would be useless for the purposes of a ship canal, but it demonstrates the practicability of making a canal suitable for the Admiralty on similar lines to the present one. At one time the sea ran between the Forth and the Clyde, but the old channel was filled up with sand and clay. This proves that a canal could be made upon a level which would not require the use of locks.

Launch of the Cup Contestant.

This week the new contestant for the "America's" cup, "Shamrock III," has been launched from the yard of Wm. Denny & Bros. Sir Thomas Lipton and his advisors are very confident that this third boat of his will win the cup. In her construction the aim has been to combine strength with lightness. For the hull nickel steel has been used, with better effect than in "Shamrock II," which had manganese bronze. The deck is plated with aluminum and covered with canvas. The frames

are bulb angles of nickel steel, the angles lighter than in "Shamrock I," but spaced more closely together, to give the necessary strength. The strapping and tying of the frames is very thorough. The whole strength of the hull lies practically in the frame work, but the plating of the underbody is heavy enough to give additional rigidity. In the plating, where weight of hull is not against the stability of the boat, the plates are about $\frac{1}{4}$ inch in thickness, but much thinner on the top sides.

B. T.

Siloxicon, a New Refractory Material.

E. G. Acheson of Niagara Falls, N. Y., who discovered the process for making carborundum and that for making manufactured graphite, has discovered and patented a new compound to which he has given the name Siloxicon. It consists of carbon, silicon and oxygen, and if all the claims are supported it will be found that Siloxicon possesses physical and chemical properties of very great interest and importance to the field of metallurgy.

Siloxicon is the product of a new furnace that has been installed in the plant of the International Acheson Graphite Works at Niagara Falls, N. Y. This furnace is about 30 feet long, 8 feet wide and is built up to a height of about 6 feet when ready for operation. The raw materials used in the manufacture are ground coke and sand in proper mixture. One thousand electrical horsepower is applied to the furnace, and Siloxicon forms at a temperature ranging from 4500 to 5000 degrees. With the present size furnace the product is about 6 tons to a furnace. The walls of the furnace are of loose brick, no mortar being used in the building. The raw material is thrown into the furnace about a multiple set of flat cores, two or more in number. Siloxicon comes from the furnace in a loosely coherent mass and is then ground in a mill so as to pass through a No. 40 sieve, when it is ready for shipment in barrels.

Mr. Acheson describes Siloxicon as an amorphous gray-green compound when cold and light yellow when heated to 300 degrees F., or above; very refractory to heat, insoluble in molten iron, neutral toward basic and acid slags, indifferent to all acids save hydrofluoric, unattacked by hot alkaline solutions and self binding to such degree that the use of a separate binding agent is not essential in forming it into crucibles, furnace linings, fire bricks and such other articles as may with advantage be made from it. The various articles may be formed by simply moistening the pulverulent material with water, molding and firing, or a carbonaceous or other binding agent may be used if desired. To-day the greater part of metallurgical operations are conducted with high grade fire clays, but these have been improved upon by the use of chrome, silica and magnesite. However, the best of these fall short of perfect results, either on account of their low melting point or the reaction that occurs between the slags. Siloxicon is insoluble in metal, infusible at high temperature and neutral to clays, thus forming an ideal material for metallurgical work. It is also unoxidizable. As Siloxicon is made at a temperature ranging from 4500 to 5000 degrees it is evident that it is capable of withstanding any heat produced by flame or fuel combustion. For this reason it is believed that Siloxicon will be a valuable lining where oil fuel is used, for at present under this intense heat trouble is experienced in getting something to withstand it. While Siloxicon is made in a furnace similar to carborundum it forms previous to the carborundum formation. In the manufacture of carborundum some Siloxicon is formed, but it is found outside the carborundum core, where the heat of the furnace does not reach the higher temperature necessary to the manufacture of carborundum.

Justice Cox, Jr., & Co., Limited, Philadelphia, Pa., have secured an order for shipment to Mexico for 47,500 tons of new 75-pound steel T-rails and fastenings, sufficient for 400 miles of road. These rails have been sold for use on one of the Mexican roads, for delivery the balance of this year and first three months of 1904.

The Lady Ensley Property.

(By Telegraph.)

BIRMINGHAM, ALA., March 31, 1903.—The Sloss-Sheffield Steel & Iron Company have finally come into possession of the Lady Ensley Coal, Iron & Railroad Company, embracing 16,000 acres of ore lands and 17,000 acres of coal lands in fee simple, from from encumbrances, and on which there are already developed ore mines producing 30,000 tons of ore per month besides two coal mines and 200 coke ovens. Formerly there were held against this company two issues of bonds, one for \$1,500,000 and another for \$500,000, and \$2,000,000 of stock, and a large amount of judgments, aggregating about \$300,000. A decree of sale was entered and the property sold on March 30, 1903. No one else bid on it and the Sloss-Sheffield Steel & Iron Company secured the property at the upset price fixed by the court. This property is estimated by competent and conservative parties to be worth from \$2,000,000 to \$2,500,000.

The litigation over this property existed for more than ten years, and the complications were so numerous that it seemed almost impossible to bring it to a close. This was done by the Sloss-Sheffield Steel & Iron Company acquiring all the liabilities of the Lady Ensley Coal, Iron & Railroad Company, including their \$2,000,000 of stock. This valuable property is added to the assets of the Sloss-Sheffield Steel & Iron Company without any additional liabilities, as all old securities have been canceled and no new ones issued.

Association of Licensed Automobile Manufacturers.

Through the efforts of George H. Day, president of the Electric Vehicle Company, with offices at 100 Broadway, New York, the Association of Licensed Automobile Manufacturers have been organized to protect and harmonize the interests of the members.

One of the most important objects attained in the organization of the new company is the stopping of the constant litigation of the large makers of automobiles over the Selden patent, which practically covers the application of gasoline engines for the propulsion of vehicles, and which is controlled by the Electric Vehicle Company. Hereafter all the companies in the association will be licensed to operate under the patent upon payment of a stipulated royalty. The association will also hold the patents of the various companies, some 400 in all, and will protect them from infringement by outside companies, as well as license those members who desire to use them. It is also intended to hold meetings from time to time to perfect the machines and to form plans for the betterment of the trade in general. Another important feature will be the standardization of the parts used in all automobiles, so that these may be replaced at any station, irrespective of make. It is expected that under these conditions the machines can be more rapidly developed.

The present membership includes: Winton Motor Carriage Company of Cleveland; the Olds Motor Works, Detroit; the Peerless Automobile Company, Cleveland; the Searchmont Automobile Company, Philadelphia; the Haines-Apperson Company, Kokomo, Ind.; Apperson Brothers' Automobile Works, Kokomo, Ind.; the Knox Automobile Company, Springfield; the Locomobile Company of America, Bridgeport; the Autocar Company, Ardmore; the George N. Pierce Company, Buffalo; the Pan-American Automobile Company, New York; the International Motor Company, Toledo; the United States Long Distance Automobile Company, New York; the Pope-Robinson Automobile Company, Boston; the Waltham Mfg. Company, Waltham; the Stevens-Duryea Company, Springfield; the H. H. Franklin Mfg. Company, Syracuse, and the Electric Vehicle Company, Hartford.

The officers are Frederick L. Smith of the Olds Motor Works, Detroit, president; Barclay H. Warburton of the Searchmont Automobile Company, Philadelphia, vice-president; Henry B. Joy of the Packard Motor Car Company, Detroit, secretary and treasurer, and George H. Day of the Electric Vehicle Company, Hartford, general manager.

OBITUARY.

GEORGE SINGER, JR.

George Singer, Jr., died last week at the family residence, after a six weeks' illness, of paralysis. Mr. Singer was a well-known business man, being formerly a member of the firm of Singer, Nimick & Co., steel manufacturers, now one of the constituent interests of the Crucible Steel Company of America. With his brother, W. H. Singer, he was instrumental in forming that firm. He retired from the active business management of the firm some years ago, but held his interest in the business. About six weeks ago Mr. Singer suffered a slight stroke of paralysis, which left him in a weak condition. He leaves a son and a daughter—Harry Singer, who has been in Europe for some time, and Miss Louise Singer, who makes her home with her father. A brother, W. H. Singer, is now in California.

NOTES.

THOMAS I. RANKIN, superintendent of the foundry of the Abram Cox Stove Company, Philadelphia, Pa., died on the 22d inst. from complications resulting from a recent operation. Mr. Rankin was 45 years of age and had been prominently identified with the foundry trade. He was for a number of years president of the Philadelphia Foundrymen's Association.

WILLIAM CHISHOLM STUBBS of Cleveland, Ohio, treasurer of the Struthers Furnace Company, died at his home on March 29 of pneumonia, aged 31 years. Mr. Stubbs had been connected with the company for two years, prior to which time he had been connected with the Wilmington Washed Coal Company of Chicago, of which he was the secretary. He leaves a widow and three sons.

DAVID JOY, the famous inventor of the Joy valve gear, died in Hampstead in the middle of March. He was born in Leeds in 1825 and was connected with different firms of locomotive builders, going to the Barrow Steel Company in 1876. In 1879 he took out his first valve gear patent.

ANSON O. KITTREDGE, who was editor of *The Metal Worker* for a number of years prior to 1893, died at Boston on March 24 while on a visit to that city. Mr. Kittredge at the time of his death was president of the Account, Audit & Assurance Company of New York, and Professor of Theoretical and Practical Accounting in the School of Commerce, Accounts and Finance of the University of New York. He was one of the founders of the New York State Society of Certified Public Accountants. Mr. Kittredge was 55 years of age and is survived by a widow and three children.

JAMES H. SNOW, the founder of the Snow Steam Pump Works in Buffalo, N. Y., and at the time of his death connected in an official capacity with the Standard Oil Company, being general superintendent of the National Transit Company, died in New York City on March 26, aged 52 years.

New York Metal Exchange.

The annual election of officers of the New York Metal Exchange took place on Monday, March 30, at the Exchange Building, Burling Slip, New York City. The following officers were elected to serve for the ensuing year:

President, Robert M. Thompson of the Orford Copper Company.

Vice-President, Adolph Lewisohn of the United Metals Selling Company.

Treasurer, Charles S. Trench of Charles S. Trench & Co.

Members of the Board of Managers: B. Hochschild of the American Metal Company, Limited; H. H. Hendricks of Hendricks Brothers; L. Nachmann; G. E. Behr of Behr & Steiner; Jesse Lewisohn of the United Metals Selling Company; Wm. Jay Ives; George W. Jacques; J. H. Lang of the National Lead Company.

Arbitration Committee: Edmund Hendricks of Hendricks Brothers, S. A. Jennings of Bruce & Cook, J. Mitchell Clark of Naylor & Co., E. A. Caswell, L. Vogelstein.

PERSONAL.

Albert Fischer, president of the Fischer Foundry & Machine Company, South Side, Pittsburgh, has sailed for Germany for an extended visit.

Charles M. Schwab, president of the United States Steel Corporation, has promised to be in Homestead on May 14 to attend the dedication of the Charles M. Schwab Manual Training School, Mr. Schwab having furnished the money for the building.

Fred. W. Bauer, chief clerk in the Cincinnati office of the Carnegie Steel Company and the American Steel Hoop Company, has resigned to accept a position with Rogers, Brown & Co. The change occurred on April 1.

Clarence Price, formerly purchasing agent for the Chicago & Alton Railroad, has been appointed New York agent for the American Car & Foundry Company.

Wm. R. White has been elected chairman of the Robeson Iron Company in place of Wm. Coleman Freeman, who died February 7; and S. H. Chauvenet was elected manager of the furnace in place of Geo. R. Taylor, who died February 15.

Guy R. Johnson has been promoted from furnace superintendent at Joliet, Ill., to the superintendency of the South Chicago blast furnaces of the Illinois Steel Company, at South Chicago.

Cornelius Shields, who is first vice-president of the Dominion Iron & Steel Company of Sydney, C. B., has been elected president of the Consolidated Lake Superior Company. Edward H. Sanborn, formerly general manager of the National Association of Manufacturers and recently assistant to Theodore C. Search, vice-president of the Consolidated Lake Superior Company, succeeds Mr. Search. W. P. Douglas has resigned as secretary and assistant treasurer.

The Pittsburgh Negotiations.

(By Telegraph.)

PITTSBURGH, PA., April 1, 1903.—Nothing positive has developed this week in regard to the Jones & Laughlin Steel Company and Clairton Steel Company deals, by which these two concerns are to be absorbed by the Steel Corporation. The impression is growing that the deal for taking over the Jones & Laughlin Steel Company will not go through, but in the case of the Clairton Steel Company, it is believed that the deal has practically been closed and that the vast ore properties and the three blast furnaces and open hearth steel works of this concern have been acquired by the Steel Corporation, and that only a suitable time is being awaited to make the announcement.

The French Iron Production.—The Minister of Public Works of France has issued the following statistics of the production of iron and steel in metric tons:

	1902.	1901.	1900.
Mill and steel pig.....	2,012,232	1,812,062	2,166,505
Foundry iron and direct castings.....	415,195	576,761	547,793
Total pig iron.....	2,427,427	2,388,823	2,714,298
Iron rails.....	320	216	627
Iron bars and shapes.....	572,541	524,303	640,953
Iron sheets and plates.....	52,965	42,636	66,694
Total rolled iron.....	625,826	567,155	708,274
Steel rails.....	301,434	291,528	278,194
Steel merchant bars and shapes.....	653,931	614,018	671,377
Steel sheets and plates.....	276,287	269,908	276,966
Total rolled steel.....	1,231,652	1,175,454	1,226,537

These results, while better than those for 1901, are still far from brilliant.

An estimate of the production of cars in the United States during 1902 was printed in the *Railroad Gazette* of December 26. The figures published at that time were obtained direct from the builders, and showed that the total output, exclusive of electric cars and those built in railroad shops, was 164,547 cars. Subsequent inquiries give 24,721 as the number built of steel throughout, making the proportion of steel cars 15 per cent. of the total. In 1901, out of a total of 144,267, the number built of steel throughout was 22,288, which also figures to 15 per cent. of the total, although 2433 more steel cars were built in 1902 than in 1901.

MANUFACTURING.

Iron and Steel.

The La Belle Iron Works, Steubenville, Ohio, have decided to erect a second blast furnace and contracts for most of the equipment have been placed. No. 1 stack, which is being rebuilt, is almost completed and will go in blast early in April. It will have a daily capacity of 400 tons, and the new stack will be a duplicate of No. 1, being 20 x 90 feet in size. It is expected to have the new stack completed early next year. The La Belle Iron Works are extending their operations in other ways and now have under construction 400 coke ovens, whose output will be large enough to supply coke to both of the stacks. Skelp mills for rolling sizes up to 12 inches wide are now under erection and will be completed within a few months. The La Belle Iron Works buy more or less pig iron in the open market, but when the second stack is completed they will be in shape to make all the pig iron they use.

The Graham Nut Company of Pittsburgh, manufacturers of nuts, bolts, rivets, washers, &c., have decided to incorporate and have been granted a charter. The incorporators are Albert Graham, Harry C. Graham and Charles J. Graham.

The Penn Iron & Coal Company have completed the rebuilding of their blast furnace at Canal Dover, Ohio, and it was blown in on Monday, March 23.

The Sterlingworth Railway Supply Company, Easton, Pa., have expended during the past four months some \$55,000 to \$60,000 in improvements to their rolling mill department, consisting of gas converters, a 100-ton gas furnace, 800 additional horse-power Berry boilers, 1200 horse-power Corliss rolling mill engine and a full equipment of steel rolls for the manufacture of angles, I beams and channels up to 15 inches.

Sylvester & Co., Boston, are building a new factory for the manufacture of spikes, bolts and forgings, at Danvers, Mass., where their rolling mill is located.

The Altoona Iron Company of Altoona, Pa., have booked a large number of heavy orders but are complaining of being short of men. During the winter a number of improvements have been made to the works, including new heating furnaces and a coal and iron wharf and an addition to the main building. So many orders have been booked that the mills are running on double turn day and night.

On account of the small amount of capital stock of the Union Steel & Chain Company of New York outstanding, and the prosperous condition of their business, and in view of placing their affairs on a permanent business basis, the Board of Directors have called a meeting of the stockholders to be held at the office, 71 Broadway, April 14, to vote on the reduction of the authorized capital of \$60,000,000 provided for in the charter to \$2,000,000, which amount will represent the properties owned free and unencumbered. While the stockholders have voted to change the name of the corporation to the "Union Iron & Steel Company," papers will not be filed for this change until the authorized capital is reduced according to the laws of the State of Delaware.

The Jackson Iron & Tin Plate Company, Clarksburg, W. Va., advise us that it is their intention to operate their tin plate plant to full capacity during the coming season, feeling that the present condition of the tin plate market warrants it. This company have not in contemplation the construction of any further finishing capacity. If anything is taken up in the future it will be with the view of adding open hearth furnaces to supply steel.

The Carnegie Steel Company of Pittsburgh have commenced active work on the new 130-inch plate mill to be built at the Homestead Steel Works.

The rail plant of the Pennsylvania Steel Company, at Steelton, Pa., broke all its records last week. The mill in one 12-hour turn made 557 tons one day and on another 541 tons. The blast furnaces were held back by a lack of coke, but were operated all week. Shipments were delayed by lack of cars. Anthracite coal is scarce, but bituminous is received in large quantities. Work on the new buildings of the company is going rapidly forward and new railroad yards are being built. The new shops already put in operation are running on full time and this week much of the machinery of the old shops was transferred to the new. The mechanical departments have orders on their books sufficient to close the year, and if nothing unforeseen occurs the year 1903 will be the most prosperous in the history of the company.

The William B. Pollock Company of Youngstown, Ohio, have secured a contract for the plate iron work for the new blast furnace to be erected by the National Steel Company at Youngstown, Ohio.

The Pittsburgh Tube Company, Pittsburgh, have incorporated with a capital of \$100,000; directors, G. A. Martin, Pittsburgh; H. M. Scott, Braddock; Clyde Overholt, Scottsdale; T. C. Graham, Allegheny.

General Machinery.

Edgar W. Summers of Youngstown, Ohio, has been granted a patent for a car brake and roller side bearing for cars. It is proposed to manufacture this device in Youngstown.

The O. K. Tool Holder Company, Shelton, Conn., are now making a new size holder, measuring $\frac{3}{4}$ x $1\frac{1}{2}$ x 8 inches. This holder will be known as Size D, and, it is stated, is better suited for planer use and other heavy work. This firm have also added a larger size cutting off tool, size C, $\frac{5}{8}$ x $1\frac{1}{4}$ inches.

The Birmingham Iron Foundry, Derby, Conn., manufacturers of rolls, heavy castings and rolling mill machinery, are building a steel addition to their machine shop 75 x 165 feet. The new part will be used as an erection shop and roll department and will contain among other tools one 20-ton and one 5-ton crane, and a large planer 84 x 84 inches by 31 feet.

Having outgrown their present quarters, the Ray Automatic Machine Company of Cleveland, Ohio, have purchased a tract of about six acres of land at Berea, seven miles from Cleveland, where they will erect a large plant, which will contain machinery, nut and bolt and automobile parts departments. Plans for the buildings have not yet been completed, but as soon as the preliminaries are arranged work of construction will be commenced. The property is located on the Lake Shore, Big Four, and Cleveland & Southern Electric railroads.

Watkins, Skellenger & Co., Clinton, Iowa, have leased the machine shop, fully equipped, of the Clinton Mfg. Company. The firm are building machinery of special design for the manufacture of steel bed springs, and report orders booked for this type of machine sufficient to keep the plant busy for some time. Plans are being perfected for the building of several standard styles of wire working machines and preparations are making to build special machinery according to contract.

The business of the Moline Tool Company, Moline, Ill., which has until recently been conducted as a partnership, has been incorporated under the name of the Moline Tool Company, with a capital stock of \$12,500, the incorporators being David W. Hunt, George Ahrens and Wilson P. Hunt. The company will manufacture special machinery, speed lathes, gauge drills, &c. A new single story machine shop, 40 x 80 feet, is now building. The shop will be equipped with all modern improvements and will have a saw-tooth roof.

Dodge & Day, modernizing engineers, of Philadelphia, have been commissioned to report on motor equipment for the Fifth-Sterling Steel Company of Pittsburgh.

To their line of reversible pneumatic motors the Helwig Mfg. Company of St. Paul, Minn., have added a No. 2 end spindle for metal work and a wood boring motor, end spindle, both reversible. They are receiving many rush orders for these and their other sizes, and have a greatly increased demand for their pneumatic staybolt clipper and bolt and rivet clippers.

The New York Blower Company of Bucyrus, Ohio, have received a contract for the heating and ventilating apparatus for the Chicago post office building. The New York Blower Company are furnishing a number of blowers to be used on United States battle ships.

The American Engineering & Reduction Company of Cleveland, Ohio, have been formed to market a new ore concentrator, the invention of Charles H. Lane, who is identified with the American Foundry & Machine Company of Ravenna, Ohio. The latter company will manufacture the device. The inventor claims that by the use of his machine, which is operated without water, vast quantities of tailings containing valuable ore may be worked over at great profit. The greatest use for the invention will be found in the desert sections of the West, where the absence of water supply precludes the working of large and highly valuable beds of ore.

The Vilter Mfg. Company, Milwaukee, Wis., builders of refrigerating and ice making machinery, Corliss engines, brewers' machinery and bottling outfits, have issued an extensive list of contracts recently closed with brewing, ice manufacturing and other companies throughout the country for refrigerating and ice making machines. Included also are contracts for many Corliss engines from parties in the West, prominent among which is one from the Wisconsin Bridge & Iron Company of North Milwaukee, for a 15 x 36 Corliss engine.

National Forge Company, Pittsburgh, have incorporated with a capital of \$10,000; directors, Andrew McMillen, W. E. McMillen of Whiteash; C. E. Long of Oakmont, and Andrew Lyle, Edwin Bailler and H. E. Francis of Pittsburgh.

The Cross Engineering Company have incorporated for the manufacture of steel, iron, &c., at Carbondale, Pa.; capital, \$100,000; directors, Geo. W. Cross, H. S. Woodward, H. O. Watrous.

Washington Foundry & Machine Company of Washington, Pa., have recently incorporated with a capital of \$20,000; directors, H. G. Manning, J. F. Birch, George M. Lavis, all of Washington.

Power Plant Equipment.

The difficulty between the boiler makers and the management of the Vulcan Iron Company, at Wilkes-Barre, Pa., over a wage scale for the coming year, has been settled by a general advance of wages aggregating 10 per cent. A request for an advance by the molders of the Vulcan Iron Company is still pending. The molders of the Aills-Chalmers works, at Wilkes-Barre, have been refused an advance. The Vulcan Iron Company have booked a large number of orders, among them one for

small engines and parts of steam shovels from Kerbaugh & Co., the railroad and bridge contractors.

The order recently received by the Brown Corliss Engine Company, Corliss, Wis., from the Middlesex & Somerset Traction Company of New Brunswick, N. J., included one 16 and 30 x 42 inch horizontal cross compound engine and one 18 and 34 x 36 inch vertical cross compound engine.

The American Steam Gauge & Valve Mfg. Company, Boston, Mass., have reincorporated under the laws of the State of New Jersey. The company operate a plant at Jamaica Plain and the plant of the Mowray & Phillips Foundry & Metal Company of Boston. Later on it is their intention to erect a new plant combining both of the present ones.

The capital stock of the Buffalo Pitts Steam Roller Works has been increased from \$125,000 to \$200,000. This company are controlled by the same interests as the Buffalo Pitts Company, manufacturers of traction engines.

W. H. Deltzel, president of the village of Wayland, N. Y., writes us that the village has voted \$25,000 for the construction of water works. No arrangements have as yet been made for either the engineer or for equipment.

The building of the large electric power plant of the Knoxville Power Company, on the Little Tennessee River, near Knoxville, Tenn., is practically assured, as those interested have secured sufficient contracts for power to convince them that the plant will be a good investment. The plant will be operated by water power and will have a capacity of about 25,000 horse-power. It is probable that construction will begin this spring. Morris & Fay, 135 Broadway, New York, are counsel for the company.

A 100 horse-power water wheel and a 75-kw. alternator are required by the Tunkhannock Electric Light Company, Tunkhannock, Pa., for their new water power plant on Tunkhannock Creek, where they expect to have a 7-foot fall of water.

Regarding the water power improvements that the J. M. Odell Mfg. Company will make to their mill at Bynum, N. C., John W. Hayes, civil engineer, Petersburg, Va., writes that he has prepared the plans for the dam and head gates and reported upon the power available, but the wheel layout is still under discussion awaiting the determination of the power immediately required. It is probable that plans will be drawn for 1000 horse-power in two units, and one of these installed at this time.

The Allegheny and Leetsdale, Pa., plants of the Riter-Conley Mfg. Company are operated entirely by Westinghouse gas engines, aggregating 1600 horse-power, which were furnished by Westinghouse, Church, Kerr & Co. of New York. A few other installations of similar nature are: Potosina Electric Company, San Luis Potosi, Mexico, 1225 horse-power; Pittsburgh Screw & Bolt Company, Pittsburgh, 245 horse-power; McClintic-Marshall Construction Company, Rankin, Pa., 585 horse-power; Marshall Foundry Company, Pittsburgh, 375 horse-power; Consolidated Gas Company, Long Branch, N. J., 600 horse-power; North Baltimore Electric Light & Power Company, North Baltimore, Ohio, 250 horse-power; light and power plants at Sistersville, W. Va., and Hutchinson, Ky., each 125 horse-power.

The Biloxi Street Railway & Power Company, Biloxi, Miss., will receive bids on April 6 for all machinery, material and labor necessary for the building of a complete modern street railway and lighting system, to consist of brick power plant, approximately 50 x 100 feet and 20 feet high from floor to ceiling; three 150 horse-power water tube boilers; two duplex boiler feed pumps, $7\frac{1}{2}$ x 5 x 6; primary heater of 170 square feet tube surface; secondary heater of 117 square feet tube surface; jet condenser of 11,000 pounds steam capacity per hour, vacuum of not less than 26 inches, complete with pump; one 300 horse-power tandem compound single valve, side-crank engine, direct connected to one 200-kw. railway generator; one 225 horse-power tandem compound four-valve side crank engine, 150 revolutions per minute, direct connected to 150-kw. three-phase 2300-volt alternator; one 125-volt direct current exciter of proper size for belting to fly wheel of 225 horse-power engine; one 25-light constant current are light regulating device and 25 are lamps, 6.0 amperes each, for series alternating current arc street lighting; one 5-panel blue Vermont marble switchboard, &c.

The Aultman-Taylor Company of Mansfield, Ohio, have recently closed several important contracts for Cahall boilers, among them one for the power plant for the New York Central Railroad Company's large elevators at Weehawken, N. J. This will consist of four horizontal water tube boilers of 500 horse-power each. Another large order has been received from the National Steel Company for the New Castle, Pa., plant of the Carnegie Steel Company. This will include 15 boilers of 250 horse-power each.

Hoover & Mason of Cleveland, consulting engineers, are placing contracts for a new power plant to be erected at the Cleveland ore docks of the Pennsylvania Railway Company. Contracts for the piping have been placed with the Cleveland Steam Fitting & Supply Company.

Foundries.

The large new plant of the Sharon Foundry Company, Wheatland, Pa., is nearly completed and will be put in operation in April. The output will be heavy castings and ingot molds.

The capital stock of the Michigan Malleable Iron Company, Detroit, Mich., at a recent meeting of the stockholders, was increased from \$300,000 to \$600,000. Of the increase \$100,000 was subscribed in cash and \$200,000 was a stock dividend.

The Altoona Foundry & Machine Works, Altoona, Pa., have begun the construction of a 30 x 70 foot wing to the foundry. Plans have been made also for a new gray iron foundry 66 x 170 feet; cleaning room, 50 x 60 feet; core room, 40 x 48 feet, and a cupola building, 35 x 50 feet. It is expected that contracts for these improvements, which will practically double the capacity of the plant, will be commenced during the coming summer. The company report unusual prosperity and more opportunities for orders than they can hope to grasp with their present facilities.

The directors of the Williamsport Clutch & Pulley Company of Williamsport, Pa., have authorized the construction of an addition to their present plant, the old Bubb-Rundio foundry. The annex will be 70 x 160 feet and will be built of steel, which is to be delivered within five weeks by the Fort Pitt Bridge Works of Pittsburgh. The company have rush orders booked that make it absolutely necessary to have the new addition ready for operation within the next three months.

Baughner, Kurtz & Cox of York, Pa., have just completed a hurry order for a large cylinder for the York Haven Power Company, and so pleased have the officials of the latter company been that more orders will follow. The casting of a 10-ton grinder for a powder mill has given such satisfaction that an order for six more of the same kind has just been placed. The company are enjoying a record breaking year.

The Colonial Foundry & Machine Company, with offices at 251-253 Broadway, New York, have more than doubled the capacity of their plant at South Norwalk, Conn. They manufacture Wing disk fans, exhausters, steam, gas and gasoline marine engines, blowers, acetylene generators, coal and combination coal and gas ranges, stoves, &c. They report a very large demand for their Colonial ranges, which possess a number of new and distinctive features.

The Chicago Malleable Castings Company, West Pullman, Chicago, have recently installed many improvements to handle their increased output. These consist of four 30-ton annealing ovens, giving a surplus capacity in this department; complete ventilating exhaust over core ovens, new batteries of friction exhaust tumbling barrels, new Sturtevant monogram type blowers for melting furnace, and new 10-ton melting furnace. The output by May 15 will be increased 75 per cent.

At a meeting of the Board of Directors of the West Allis Malleable Iron & Chain Belt Company, West Allis, Wis., the following officers were elected: Edwin Reynolds, president; O. L. Hollister, vice-president and general manager; Chas. F. P. Pullen, treasurer; W. H. Shenners, secretary; Emil Langers, assistant secretary, and F. G. von Spreckelsen, superintendent and mechanical engineer.

The Duplex Mfg. Company of Cleveland, manufacturers of steel catch basins and other street drainage goods, are erecting a foundry at Elyria, Ohio, to take care of their Western trade. The main building will be 70 x 100 feet, and this will be enlarged to double the size within a year. The site adjoins the Lake Shore & Michigan Southern Railway and there will be a spur running into the yard. The company have purchased a gas engine for power equipment and are in the market for a large jib crane. Officers are F. H. Jackson, president, and George M. Pierce, secretary-treasurer.

Bridges and Buildings.

Lewis F. Shoemaker & Co. report the Schuylkill Bridge Works, Pottstown, Pa., as extremely well employed on bridge work, mill work, &c., which they finish and erect complete. They are now increasing their facilities, which, when completed, will bring their capacity up to 1000 tons per month.

The Garry Iron & Steel Company of Cleveland have taken contracts for structural material for factory buildings for the Massey Machine Company of Watertown, N. Y., and for the Enterprise Glass Company of Sandusky, Ohio.

L. E. Brelsford, Zanesville, Ohio, county auditor of Muskingum County, is calling for proposals on three steel bridges, one 163 feet long, one 107 feet long and one 115 feet long. Bids will be opened April 20.

C. P. Hoffman Construction Company have incorporated to construct bridges, &c., with main offices at Nagareth, Pa. Capital, \$50,000; directors, C. P. Hoffman, C. H. Metler, J. N. Hoffman, Conrad Metler, Wm. Bennett and J. J. Heintzleman.

The East Chicago Bridge & Iron Works, East Chicago, Ind., have filed articles of incorporation at Indianapolis with a capital stock of \$50,000. The Board of Directors are Marvin H. Dey, Arthur J. Rose, C. O. Baughman and Suzanne F. Baughman. John W. Creekmur and N. E. George are named as additional incorporators.

Fires.

The Hetherington & Berner Structural Iron Works, Indianapolis, Ind., were damaged by fire March 28, entailing a loss of about \$60,000.

The main part of the smelting works of the United States Reduction & Refining Company at Canyon City, Col., were destroyed by fire March 26. The loss is about \$100,000.

The tinware factory of Hyman & Hillson of Boston and the table factory of Brown & Simonds, adjoining, at Somerville, Mass., were destroyed by fire March 26. The entire loss is placed at \$100,000.

The machine shops of the Flint-Lomax Company, Denver, Col., were recently damaged \$50,000 by fire.

The Bingham hoist of the Hidden Fortune Mining Company, at Lead, S. D., was destroyed by fire March 25, causing a loss of \$50,000.

J. Walshaw's woolen mills, at Bolton, Ont., were destroyed by fire March 25. The loss is about \$50,000.

The car shops of the New York, Ontario & Western Railroad, at Norwich, N. Y., were burned March 30, causing a loss of \$15,000.

The car building plant of the Pennsylvania Railroad, at Fort Wayne, Ind., was damaged by fire March 25. The loss is between \$75,000 and \$100,000.

The factory of W. K. Wampole & Co., Philadelphia, Pa., chemists, was destroyed by fire March 26, entailing a loss of about \$60,000.

Hardware.

The Keystone Steel Mat & Mfg. Company, successors to the Keystone Steel Matting Company, Pittsburgh, Pa., are now equipping a large and commodious factory for the manufacture of the Keystone steel matting. The business was recently organized into a stock company for the purpose of increasing the facilities. We are advised that the company are shipping their goods all over the world and that they are also supplying elevated and surface car lines with their matting.

The Chicago Scale Company, Chicago, Ill., use about 100 carloads of steel I beams, for frames for wagon and stock scales, each year. The company advise us that their scales are the only ones arranged for hanging in a steel frame.

The Forest City Bit & Tool Company, Rockford, Ill., manufacturers of wood boring bits and tools, have recently more than doubled their manufacturing capacity and are now in a position to fill orders promptly.

The Harding Edge Tool Works, Newark, N. J., in the manufacture of hatchets instead of iron are now using soft steel for forging the pole, which enables them, at an advance of a few cents per dozen, to furnish nicer finished low priced hatchets than before. These hatchets are known as the Republic brand.

E. B. Badger & Sons Company, 63-69 Pitts street, Boston, Mass., advise us that their carbonic acid gas hand fire extinguisher has been examined under the standard of the National Board of Fire Underwriters and is on the approved list of fire extinguishers as issued by the National Fire Protective Association. This extinguisher has had a large sale during the past year and the demand for it is steadily increasing.

During the past two years the Ohio Pump & Brass Company, Columbus, Ohio, have increased their plant to double its former capacity, notwithstanding which they are expecting soon still further to enlarge it. The company manufacture water lifts, beer pumps, plumbers' supplies, gas and water supplies, brass, bronze and aluminum castings, gas service cocks, steam cocks, stop cocks and all kinds of goods pertaining to natural gas supplies. Fifty men are employed.

The Columbus Handle & Tool Company, Columbus, Ind., during the past year have added some expensive and up to date machinery in their logging tool department, and now have one of the best equipped plants for this class of work in the country. The company make all of the wood work as well as the iron work for these goods.

The Frost Wire Fence Company, Cleveland, Ohio, manufacture the Frost coiled spring wire, which is referred to as twice as strong as soft wire of even gauge, and fully providing for expansion and contraction. They refer to the demand for their wire fencing as very large and steadily increasing, requiring thousands of tons of hard spring wire annually. They have just issued their 1903 catalogue describing the Frost fence, coiled spring wire and steel gates, and will be pleased to send a copy on application.

Miscellaneous.

The Mason Company, Bellaire, Ohio, manufacturers of the Mason all cast combination heater, have increased their capital from \$50,000 to \$70,000 and will erect a building 100 x 105 feet, three stories high, which will double the capacity of their plant. They have had a very heavy demand for their heater and find it necessary to very much enlarge their capacity.

Extensive improvements are being made at the Middletown Car Works, Middletown, Pa., and preparations are being made for the construction there of steel underframes for cars, and orders have been booked for a number of all steel cars for an Arizona road and a number of steel frame express cars for the Brooklyn Rapid Transit Company. Heretofore the company have built only wooden cars. An addition of 110 feet has been built to the erecting shop and a storehouse 32 x 200 feet is now in the course of erection. Other additions include new engines

and boilers for the foundry, core ovens, pressed air riveters and cranes and additions to the equipment of the blacksmith shop. The company are at present building a large number of cars for a railroad in China, which are being lettered in Chinese characters at the works.

The Gelser Mfg. Company of Waynesboro, Pa., have received an order from Korff, Honsburg & Co. of Mexico City, Mexico, for four traction engines and four threshers. The company are doing a good business in the Southwest and Mexico and are building several warehouses at points in that territory.

The Pittsburgh & Tidewater Coal Company have been organized in Southern West Virginia to mine bituminous coal for export trade. The capital of the new company is \$1,500,000 and they have 24,000 acres of land in the town of Dingess, W. Va., on the line of the Norfolk & Western Railroad and well situated for seaboard shipment. Five mines are now in operation on the property. The officials of the company are as follows: Edwin Ripley, Sherman, N. Y., president; C. K. Totten, Pittsburgh, vice-president; C. Parker, New York, treasurer, and H. D. Gamble, Pittsburgh, secretary.

The H. C. Frick Coke Company of Pittsburgh, operating the United States Coke Company in the Pocahontas fields of West Virginia, have fired up about 150 new ovens in this field. The Frick Coal Company are building about 3000 new ovens in the Pocahontas field, all of which will probably be in operation this year. The greater part of the coke made will be sent to the Illinois Steel Company.

The International Tin Company have their new plant at Bayonne, N. J., well under way, and expect to have it in operation in August. The company will engage in the smelting of tin. R. T. White is manager.

The Keystone Emery Mills, Frankford, Philadelphia, have taken out a permit for the erection of an addition to their plant which will give them a frontage on Paul street of 86 feet, the same as that on Orchard street, and a total depth of 195 feet. The extension will enable the company to double their capacity of 1800 tons a year, besides affording greater storage room, new and commodious offices and conveniences for the workmen. The additional machinery required is being constructed in their own shops. The power plant consists of a return tubular boiler and a Porter-Allen engine, each 100 horse-power.

The Commissioner of Public Works, Buffalo, N. Y., has been authorized to advertise for bids for the construction of two steel viaducts—one at the Perry street crossing of the Erie and Lake Shore railroad tracks and the other at the Clinton street crossing of the West Shore and Buffalo Creek railroad tracks.

The Buffalo & Susquehanna Railway Company have received the approval of the New York State Railroad Commission to the issuance of a first mortgage on their properties for \$6,000,000 to provide for the construction of a new line from Wellsville to Buffalo. The surveys for the road are practically completed and construction work will be rushed.

Trade Publications.

Fuel Oil Burners.—A catalogue by the National Oil Burner & Equipment Company of St. Louis describes their method of feeding fuel oil to boiler and other furnaces. The burners are so constructed that they superheat the steam or air and oil in the burner. They are placed on the outside of the furnace, so that they are easy of access and no change whatever is required in the furnace. They require no target or spatter wall for proper combustion, and it is not necessary to remove the grate bars, but simply to cover them with fire brick or cinders. There is none of the noise or vibration which usually accompany the burning of oil.

Fire Proof Construction.—The Hinchman-Renton Fire Proofing Company of Denver, Col., are prepared to estimate on concrete fire proofing, monolithic concrete buildings and concrete work of every description. In all the floor systems employed by this company the concrete is deposited on temporary wooden centering and is thoroughly rammed with special iron rammers. This tamping of the concrete greatly increases its strength and brings it into close contact with the imbedded metal, thereby increasing its resistance to sliding and insuring its protection from rust. Numerous tests have shown that concrete floors constructed on the Monier principle, with steel tension bars or cables of proper size and shape, can be proportioned to carry any loads that could possibly occur in a building. A pamphlet by the company contains much valuable information upon this method of construction.

Small Tools.—Under the title, "Can a Small Tool Room Compete with a Big Factory?" the Pratt & Whitney Company, Hartford, Conn., have issued a folder stating that they have added a building to their small tool department which fully doubles its capacity. They call attention to the fact that they are now making yearly contracts for furnishing small tools, taps, dies, reamers, milling cutters, &c., to many of the largest and most progressive machine works in the country.

"Yachts and the Best Machinery to Run Them" is the title of an interesting pamphlet by John T. Thropp & Sons

Company of Trenton, N. J. The works of this company are most favorably situated for constructing and equipping all classes of steam yachts and vessels of the lighter draft, such as towboats, steam packets, &c.

Steam Road Rollers.—The Kelly-Springfield Road Roller Company of Springfield, Ohio, have issued a handsome catalogue descriptive of their rollers, of which five sizes, from 20,000 to 37,000 pounds finished weight, are kept in stock for immediate delivery. In their "spiking" machine each driving wheel is provided with spikes placed zig-zag which project $4\frac{1}{2}$ inches from the face. These spikes break up the top surface of the hardest road quickly and effectively, leaving it so loose and smooth that the material may be shoveled up and carted away. One thousand square yards can be broken in an hour. When rolling the spike holes are filled with suitable plugs, making the faces of the wheels smooth.

Drill Chuck.—The Butler Chuck Company, Greenfield, Mass., have issued a circular giving a complete description of the patent drill chuck which they are manufacturing. In the circular the manufacturers state that the chucks adapt themselves to the work before them by tightening their own grip upon the shank of the tool through the resistance which the tool encounters, while the ordinary grip of the hand is all that is necessary to loosen it; no wrench or key is required. The chuck may be quickly adjusted and five turns of the sleeve upon the arbor change its capacity from 0 to $\frac{1}{2}$ inch. A few seconds only are required to adjust the drill and set the tool to work. The chuck is most convenient in shape and rigid in construction, the arbor and body being made of one piece of steel, which, when inserted into the spindle, makes the tool seem like part of the machine itself, and it proceeds to its work almost with the rigidity of a set screw.

Cylinder Oil Atomizer.—The Sargent cylinder oil atomizer is manufactured by the North Chicago Machine Company of North Chicago, Ill. The vaporizer consists of a cone shaped bronze casting so placed in the steam pipe that the outlet is on a level with the inlet opening. As the oil flows from the lubricator it passes through the body of the vaporizer, is heated to the temperature of the steam, and by the time it reaches the outlet at the top of the cone is sufficiently limpid to spread out over the surface in a thin film, and when it reaches the lower edge is carried along with the steam. By this means the oil is thoroughly distributed through the steam and all parts of the cylinder. The upper surface as well as the sides are effectually lubricated. This result is accomplished with one-half the quantity of oil ordinarily used. This device by atomizing the oil provides for the effective and economical lubrication of the entire cylinder.

Milling machines are described in a very handsome catalogue by the R. K. Le Blond Machine Tool Company of Cincinnati. Their universal machine is the same as the plain except that provisions are made for swiveling the table and automatically rotating the universal head. The swivel bases are of large diameter. They are locked with three bolts in a T-slot; the slot being at the extreme outside of the base gives a strong leverage and practically makes the swivel and saddle one piece. The base is graduated to degrees, and, owing to the large diameter, the marks are quite a distance apart, thereby permitting the accurate setting of the swivel. The tables can be swung 180 degrees or end for end. All of their universal machines will cut spirals up to and including 50 degrees, right or left hand.

Electrical Supplies.—In a catalogue received from the F. Bissell Company of Toledo, Ohio, we find a description of a messenger car. This is a small car or trolley, about 3 feet in length, made for emergency work in telephone and electric light construction. It is intended to be used on a messenger or guy wire for the purpose of supporting workmen when it is necessary to remove tools or clamps of any kind from a wire at a distance from a pole. This, in a good many instances, has been done in a dangerous manner by a line man making a sling out of a strap and "hitching" along on the wire. Another new article manufactured by this company is an automatic time switch. With this device it is simply necessary to set the alarm attachment on the clock at the time it is desired to turn out show window lights.

Industrial Railways.—A folder by the C. W. Hunt Company of West New Brighton, N. Y., describes some of the applications to which their industrial railways have been put. It is not usual to pay much attention to the handling of coal and ashes in a small steam plant, a wheelbarrow being considered the easiest and cheapest method of bringing coal from the storage bin to the furnace. But to install an industrial railway, equipped with a charging car, is not a costly item. The car is made of sheet steel stiffened with angle iron and the bottom is flush riveted. The tipping body cars have a dumping gear which keeps the body completely under control in dumping the load, and prevents the violent shocks that occur when the body dumps by gravity alone.

Gasoline Motors.—The Buffalo (N. Y.) Gasoline Motor Company are building motors having one-piece forged shafts.

The valves are mechanically operated. The time of ignition may be advanced or retarded while the motor is in operation, and the speed thus regulated. These motors are built with two or four cylinders, and in sizes from 2 to 25 horse-power.

Machine Tools.—We have received a beautifully gotten up catalogue by the Warner & Swasey Company of Cleveland, Ohio, describing their machine tools for iron and brass work. Their patent forming or undercut tool slide is the most characteristic feature of their forming turret lathes. By means of a lever or screw the tool is fed forward, and, passing under the piece, turns it to its proper shape and diameter. It is provided with all necessary adjustments, including a side motion for slight variations in castings. The automatic chuck provided with these machines is operated by a lever and a patented link motion gives increased leverage for closing the chuck. By means of this the pieces to be formed can be placed in position, rigidly gripped, finished and removed, without stopping the machine.

Steel Rolling Doors, Shutters and Partitions are described in a catalogue by the Columbus Steel Rolling Shutter Company of Columbus, Ohio. The illustrations show many of the wide and varied applications of these devices. One of these large rolling doors, adapted for use in freight and warehouses, shops and factories, can be raised or lowered by pulling on a hand chain placed at one side. So perfect is the balance attained in this construction that it is possible for one man to easily operate one of the largest doors with one hand. When the door is raised it is confined in a small roll beneath a hood above the opening. These doors, shutters and partitions are adapted to any building, new or old.

Rock Crushers, Screens, Traction Engines, Road Machinery, &c., built by the American Road Machine Company, Kennett Square, Pa., are described in a recent catalogue. In connection with a portable crushing plant, when frequent movings are necessary, their traction engine can be used both for operating and for hauling the outfit. In recent years traction engines have been used as the motive power for operating road machines with most excellent results. This engine is simple, durable, a good puller, easy to steer and high grade in all respects.

The Metcalfe portable and stationary gasoline engines built by the Geiser Mfg. Company of Waynesboro, Pa., in sizes from $1\frac{1}{2}$ to 15 horse-power, are described in a catalogue just issued.

Steam pumps and air compressors of many types and sizes are fully described and illustrated in a catalogue by the Hooker Steam Pump Company of St. Louis, Mo.

A catalogue by the Sprague Electric Company, 527 West Thirty-fourth street, New York, deals with their interior conduits and conduit fittings. These conduits are adapted for use in every climate and under all possible conditions.

Electric mining machinery, including motors, chain breast machines, third rail haulage plants, electric locomotives, &c., is fully dealt with in a catalogue by the Goodman Mfg. Company of Chicago.

The Waltham Watch Tool Company, 151 Wilbraham Road, Springfield, Mass., issue a circular describing their No. 2 Van Norman duplex milling machine with full universal centers and subhead. The special feature of this machine, as stated by the manufacturers, which gives it a greatly increased range of work as compared with other forms of milling machines, is the movable cutter head adapted to be set and operated at any position from vertical to horizontal. The cutter head is mounted on a ram or frame which can be moved in and out from the column or table, and the combined adjustment of the ram and cutter head permits the most advantageous use of the cutter when operating either in the horizontal or vertical position, or at any angle between these points. They have three sizes now on the market—namely, Nos. 0, 1 and 2, and the circular gives complete specifications.

Steam engines, boilers and saw mill machinery are described in a handsome catalogue by Smith, Myers & Schnier of Cincinnati. The works of this company have recently been materially enlarged and new tools of the latest and best designs have been added, so that the plant is now one of the largest and finest in the country.

The New England Motor Company, Lowell, Mass., manufacturers of electric motors and generators, have recently issued Bulletin No. 32, describing their complete line of smaller slow speed motors and generators, of the most modern and efficient design suited for direct connected outfits, printing presses and ventilating service. We are advised that they also manufacture a line of semi-enclosed and dust proof multipolar belted motors, which are universal in every respect and embody many valuable and patented features, in sizes ranging from 5 to 25 horse-power, which are known as Type M. E. These are illustrated and described in Bulletin No. 30. The smaller sizes from $\frac{1}{4}$ to 5 horse-power are designated as Type E, which is of the same general style as Type M. E.

The Iron and Metal Trades.

From all quarters come the reports of a considerable improvement in the movement of raw materials and of products, and the hope is general that that source of worry and loss may soon disappear altogether. Aside from the possible trouble among the Structural Iron workers there is little danger of any labor troubles along the line to the finished rolling mill product, and it is quite evident that the capacity for mischief of the leaders of the Structural Iron workers has been much exaggerated.

The event of the week has been the reduction in prices made by the Southern Furnace Association, which includes a considerable number of Iron companies in Alabama, Tennessee and Virginia, and embraces the largest of them. For some time past the official price has been \$18.50 for No. 2 Birmingham, but outside furnaces have been steadily underselling, so that \$17.50 has been done. Now, the association furnaces have placed the price at \$17.50 for No. 2, Birmingham, for Western territory and at \$16.50 for Eastern territory. Reports from Cincinnati indicate that other sellers are even now offering at close to \$17 for that district.

While there has been some irregularity for some time past, the action of the association comes as a surprise. However, aside from the underselling of other producers, the reasons for it are patent enough. In the East the Southern Irons have for some time past been virtually out of the market, which has been supplied by Northern furnaces and by foreign Pig Irons. These have, in fact, penetrated far into the interior, reaching Ohio River and Lake cities from the Atlantic ports and entering into Chicago via gulf ports. With No. 2 Southern Foundry selling at New York at \$20.75, there is little margin for importers at present prices abroad, but it yet remains to be seen whether values in Europe will not recede sufficiently to allow importers to hold their own to some extent. With the exception of the New England territory, very little foreign Iron has been sold for delivery during the second half for melting in this country, so that it would not take long before the importations would be sharply cut off and we would again have our market for ourselves. This, of course, applies primarily to Foundry Pig Iron. The quantities of Low Phosphorus and Special Bessemer, Spiegeleisen and Ferromanganese purchased for future delivery abroad are considerable, and they would continue to come after Middlesbrough Scotch and German Foundry Iron had long ceased to arrive.

The domestic markets, so far as rival and competing regions are concerned, will of course be somewhat affected by the latest development in the Pig Iron situation, which will be welcomed as promising to put an end to a false situation.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Apr. 1, Mar. 25, Mar. 4, Apr. 2,
1903. 1903. 1903. 1902.

PIG IRON:

Foundry Pig No. 2, Standard, Philadelphia	\$22.25	\$22.25	\$22.25	\$18.75
Foundry Pig No. 2, Southern, Cincinnati	<i>20.25</i>	21.25	21.75	15.00
Foundry Pig No. 2, Local, Chicago	<i>22.50</i>	22.50	23.00	18.50
Bessemer Pig, Pittsburgh	21.85	21.85	21.85	17.75
Gray Forge, Pittsburgh	20.75	21.00	20.75	18.25
Lake Superior Charcoal, Chicago	26.00	26.50	26.50	21.50

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh	30.00	31.00	30.00	31.00
Steel Billets, Philadelphia	<i>*29.00</i>	<i>*29.00</i>	<i>*28.00</i>	32.50
Steel Billets, Chicago	31.50	31.50	31.50	....
Wire Rods, Pittsburgh	37.00	37.00	36.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	18.50	18.50	18.00	17.50
O. Steel Rails, Philadelphia	21.25	21.25	21.25	....
O. Iron Rails, Chicago	24.50	24.00	24.00	24.00
O. Iron Rails, Philadelphia	24.50	24.50	24.50	25.00
O. Car Wheels, Chicago	24.00	24.00	24.00	19.00
O. Car Wheels, Philadelphia	24.50	24.50	24.50	17.50
Heavy Steel Scrap, Pittsburgh	21.50	21.50	20.50	....
Heavy Steel Scrap, Chicago	<i>18.25</i>	18.25	18.50	16.50

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.93½	1.93½	1.93½	1.92
Common Iron Bars, Chicago	<i>1.80</i>	1.80	1.80½	1.85
Common Iron Bars, Pittsburgh	1.85	1.89½	1.80	....
Steel Bars, Tidewater	1.75	1.75	1.75	1.80
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater	<i>1.85</i>	1.85	2.00	1.78
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.75	1.75	1.75	1.85
Beams, Pittsburgh	1.60	1.60	1.60	1.70
Angles, Tidewater	1.75	1.75	1.75	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	2.00	2.05	2.00	1.95
Skelp, Sheared Iron, Pittsburgh	2.10	2.10	2.10	2.00
Sheets, No. 27, Pittsburgh	2.65	2.65	2.60	3.00
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.90
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	2.05
Cut Nails, Mill	2.15	2.10	2.10	1.95

METALS:

Copper, New York	15.00	14.50	13.50	12.00
Spelter, St. Louis	5.40	5.25	4.90	4.20
Lead, New York	4.65	4.65	4.10	4.10
Lead St. Louis	4.57½	4.57½	3.97½	4.02½
Tin, New York	<i>30.00</i>	29.25	30.62½	26.40
Antimony, Hallett, New York	7.00	7.00	6.62½	8.00
Nickel, New York	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.99	3.99	3.99	4.19

* Foreign.

Chicago.

FISHER BUILDING, April 1, 1903.—(By Telegraph.)

In Pig Iron the most important feature of the week has been the reduction of prices by the associated furnaces in the South to \$17.50 for No. 2 Foundry, Birmingham, for the second half of the year. Lower prices have also been accepted by furnaces for Charcoal and Bessemer grades, and the tendency is toward a lower level for local Irons, although at the present time, there being very little offered, producers are reluctant to shade previous prices. There has been considerable activity in Bars, both Iron and Steel, and although there is still keen competition among the independent Bar Iron mills, the fact that the cost of production will be materially increased on April 1, through advanced wages and sliding scale contracts for fuel, has caused a strengthening of the market. Quite a number of sales have been made during the week, and at the close several important contracts are pending. Car manufacturers, railroads, agricultural implement manufacturers and wagon builders are prominent among the buyers of both Iron and Steel. A few contracts have been made extending over into 1904. While a consolidation of the independent Bar Iron interests in the Central West has not been effected on the basis previously proposed, there is still an effort to form a merger, although the prospect of success seems remote. There has been quite considerable activity in Structural Material, and important contracts are now pending for railway bridges and railroad cars. The only difficulty is the labor question, which is unsolved at the moment. Plates have continued strong and Sheets have again hardened. There has been increased activity in Rails, both heavy and light sections, and further important contracts have been placed and are pending.

Pig Iron.—The most important feature of the week is the announcement that the Southern Furnace Association has reduced the official price of No. 2 Foundry to \$17.50, Birmingham, for shipment into this section, and \$16.50 for shipment to the Eastern seaboard, where domestic Iron comes into competition with the foreign product for delivery during the second half of the year, but sales are reported to have been made at Louisville, St. Louis and Chicago yesterday and to-day on the basis of \$17.50 for No. 2 Foundry, Birmingham, deliveries to be made for the remainder of the second quarter, in some cases shipments extending over into the third quarter of the year. To within the past few days business has been very quiet. In fact, the market has been dull. The few sales which have been made, as a rule, have been compelled through necessity to meet current requirements, although exceptional instances are reported of sales being made for the last half at the prices ruling a week ago. In the aggregate about 10,000 tons were sold in lots ranging from carloads to 1000 tons, the latter being the largest individual sales, and even these have been rare. There has been a better demand for Silicon Iron, which has been sold mainly on the basis of \$20, Birmingham, for 4 to 6 per cent. Silicon, but at the close it would be difficult to make sales on this basis. Sales of Kentucky Silvery in lots of 100 to 200 tons have also been made on the basis of \$29 at the furnace or \$31.30, Chicago. Charcoal and Bessemer grades are also lower, in sympathy with Foundry, furnaces accepting orders at 50c. per ton less than the previous asking prices. At the moment a considerable sale of Malleable Bessemer is pending somewhere between \$22 and \$22.50 for the last half, although for quick shipments \$23 is still demanded. At the close 500 tons of Southern No. 2 Foundry are reported sold on the basis of \$17.50, Birmingham, for shipment during the second quarter. There is very little, if any, Mill Iron offered, and prices for such grades are little better than nominal in this market. There is some inquiry for Basic Iron, but no transactions of moment have been reported during the week. The principal buyers in the local market recently have been machinery manufacturers, merchant founders and radiator manufacturers. Southern furnaces seem to have been actuated by the fact that foreign Iron has been, in large measure, supplanting the domestic product, especially on the Eastern seaboard, but also to some extent even in the Central and Northwest. The following are the prices current, f.o.b. Chicago, the outside prices being for prompt shipment and the inside prices for delivery within the last half of the year:

Lake Superior Charcoal.....	\$26.00 to \$27.00
Local Coke Foundry, No. 1.....	23.00 to 23.50
Local Coke Foundry, No. 2.....	22.50 to 23.00
Local Coke Foundry, No. 3.....	22.00 to 22.50
Local Scotch, No. 1.....	23.50 to 24.50
Ohio Strong Softeners, No. 1.....	25.80 to 26.80
Southern Silvery, according to Silicon.....	23.85 to 25.85
Southern Coke, No. 1.....	22.35 to 23.35
Southern Coke, No. 2.....	21.85 to 22.35
Southern Coke, No. 3.....	20.85 to 21.35
Southern Coke, No. 1 Soft.....	22.35 to 22.85
Southern Coke, No. 2 Soft.....	21.85 to 22.35
Foundry Forge.....	20.35 to 20.85
Southern Gray Forge.....	19.35 to 19.85
Southern Mottled.....	19.35 to 19.85
Southern Charcoal Softeners, according to Silicon.....	25.85 to 27.85
Alabama and Georgia Car Wheel.....	28.35 to 28.85
Malleable Bessemer.....	22.00 to 23.00
Standard Bessemer.....	22.00 to 23.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	31.30 to 32.30

Bars.—There has been a decided increase in the demand for Bar Iron during the week, inquiries coming from car shops, railroads, wagon manufacturers and agricultural implement manufacturers. There has been a fair tonnage for delivery during the remainder of the current season, other deliveries extending into the fall, while some contracts have been made for delivery extending into July, 1904. In the aggregate about 10,000 tons have been sold, but there have been few if any individual transactions over 2000 to 3000 ton lots; one lot of 2000, one of 1500, several lots of 1000 with a number of 100 to 200 ton lots have been sold. Most of the sales have been made on the basis of 1.85c. to 1.90c., delivered Chicago, and only in exceptional instances, if any, has the 1.85c. basis been shaded. Although the combination of the Bar Iron mills in the Central West was not accomplished on the basis recently proposed, efforts to secure a merger have not been entirely abandoned. In Soft Steel Bars there has been a fair tonnage placed, a few small contracts covering the 1903-1904 season. The aggregate tonnage, while not heavy, has been satisfactory, and specifications of previous orders have been liberal. The following are the prices, f.o.b. Chicago, for domestic product, mill shipment: Bar Iron, 1.80c. to 1.90c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.16½c. to 2.26½c.; Angles, under 3 inches, 1.86½c. to 1.91½c., base. The merchant trade has been satisfactory and the market has remained firm at the following prices: Bar Iron, 2.15c.; Soft Steel Bars, 2c. to 2.25c.; Angles, 2.25c., and Hoops, 2.40c., base, from store.

Structural Material.—There has been some increase in the volume of business during the week, although the tonnage of sales has not been large, aggregating about 3500 tons.

Among the more important contracts made during the week has been the Kent Building, requiring 700 tons of Beams, 200 tons additional of Steel and 700 tons of Cast Iron. There have also been lots of 500 to 1000 tons for bridges and railway cars. Some important contracts are now pending, including Steel for 1000 to 2000 cars and from 3000 to 5000 tons for railroad bridges. The only disquieting feature is the labor cloud which has been hanging over the market more ominously during the past week. Premiums of \$2 to \$3 per ton are still readily obtained for prompt shipments, this fact being a prominent feature in the market at the moment. The following are prices current at Chicago for mill shipment for long delivery, 15c. premium being charged for shipment within six weeks: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. Shipments from local stocks have continued quite satisfactory and the market has ruled strong at full prices, as follows: Beams and Channels, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—While there have been no single large transactions during the week, the current production of the mills has been absorbed readily, it being almost impossible to obtain deliveries earlier than November. Some important contracts for cars are pending. For prompt shipment premiums of \$2 to \$3 per ton are obtained over official quotations. Prices for long delivery, f.o.b. Chicago, mill shipment, are as follows, 15c. per hundred being added for delivery within 30 to 60 days: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 1.95c. to 2.10c. There has continued to be an active demand for shipment from local stock and the market has ruled strong. The following are the prices current: Tank Steel, ¼-inch and heavier, 2.15c. to 2.20c.; Tank Steel, 3-16-inch, 2.25c. to 2.30c.; No. 8, 2.30c. to 2.40c.; Flange Steel, 2.40c. to 2.50c., all f.o.b. warehouse, Chicago.

Sheets.—The market has continued strong, with a good demand and full prices asked and obtained for both Black and Galvanized. In some cases even higher prices have been obtained. The following are the prices current for Black Sheets, mill shipment, carload lots, f.o.b. Chicago: No. 20, 2.60c. to 2.65c.; Nos. 22 and 24, 2.65c. to 2.75c.; No. 26, 2.75c. to 2.85c.; No. 27, 2.85c. to 2.95c.; No. 28, 2.95c. to 3.05c. Small lots from store sell at 15c. to 20c. above mill prices. Galvanized Sheets have sold mainly at 75 and 5, Chicago, for mill shipment, although in exceptional instances concessions have been granted. Sales from store have been made mainly on the basis of 75 and 2½ to 75 discount.

Cast Pipe.—The Western market has been very quiet during the week, the one important contract which was pending at Kansas City for about 18,000 feet of 36's and 5 miles of smaller sizes having been declared illegal and all bids returned. Among the more important sales have been about 23,000 feet of 24's for delivery to a gas company at St. Louis. While prices are unchanged, the market is easier in tone, in sympathy with the prices prevailing for Pig Iron. Manufacturers continue to quote, f.o.b. Chicago, as follows: 4-inch, \$34; 6-inch, \$33; 8-inch, and larger, \$32 for Water and \$1 per ton higher for Gas Pipe.

Billets.—The market has continued extremely dull, there being few domestic Billets available, the current production being largely applied on contracts and the prices demanded for foreign Billets curtailing the demand in this section. Domestic Bessemer Re-rolling Billets are nominally quotable at \$31.50 to \$32, and jobbing sales of Open Hearth Forging Billets have been made at prices ranging from \$34 to \$38, according to analysis, buyer and time of delivery, with exceptional transactions at \$1 to \$2 per ton for small sizes. Foreign Billets are nominally quotable at \$32 to \$33, delivered Chicago.

Merchant Pipe.—The market has continued to harden, although prices have not been further advanced, the demand being active, liberal specifications being received on old contracts, and some new business of moment having been placed. The following is the official schedule of discounts for carload lots, Chicago, base, random lengths, mill shipment:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
½ to ¾ inch.....	66.35	56.35	63.35	53.35
¾ inch.....	68.35	58.35	65.35	55.35
¾ to 6 inches.....	73.35	63.35	70.35	60.35
7 to 12 inches.....	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—Some contracts of moment have been placed with the mills, and the market has remained firm without essential change in prices. The following schedule of discounts for carload lots, mill shipment, Chicago, is being maintained:

	Steel.	Iron.
1 to 1½ inches.....	43.35	38.35
1½ to 2½ inches.....	55.85	35.85
2½ to 5 inches.....	60.85	45.85
6 inches and larger.....	55.85	35.85

Less than carloads, 12½ per cent. advance.

Shipments from local stocks have been on a larger scale, with a fair demand for future delivery. The market has remained firm. The following are the discounts prevailing for shipment from local stocks:

	Steel.	Iron.
1 to 1½ inches.....	40	35
1½ to 2½ inches.....	50	32½
2½ to 5 inches.....	57½	42½
6 inches and larger.....	50	..

Merchant Steel.—There has continued to be some inquiry for next season's requirements running from July, 1903, to July, 1904, but no contracts of moment have been placed during the week. There has been a fair movement on old contracts, but shipments are still somewhat slow. Tool Steel has been fairly active, and the market has remained steady. The following are the prices current at Chicago for mill shipment: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 8c. for mill shipment; Specials, 12c. upward.

Rails and Track Supplies.—About 20,000 tons of Standard Rails have been placed with local and Eastern mills during the week, one large Western road increasing its previous order by 10,000 tons, and there was a marked revival in the demand for small amounts by electric roads. Another large contract for a Southern road is pending, and there is an active inquiry from the Southwest. The rumor that premiums are being accepted for preferred shipments on Standard Rails is emphatically denied. It is understood of course that Western buyers unable to place contracts with Western mills are obliged to pay the additional freight when the orders are placed with Eastern producers. Official prices remain strong at \$28 for standard and \$29 for second quality, mill shipment. Light Rails are selling at \$35 to \$40, according to weight, and outside interests are charging a premium on small amounts. Track Supplies have continued active and strong, premiums being asked and obtained by some independent mills. The following are the prices current, Chicago, for mill shipment: Splice or Angle Bars, 2c. to 2.25c.; Spikes, 2.10c. to 2.25c.; Track Bolts, 3½ to 3¾ inches and larger, with Square Nuts, 2.85c. to 3c.; with Hexagon Nuts, 3c. to 3.25c. From store 10c. to 15c. over mill prices are asked and obtained.

Old Material.—There has been but little, if any, increase in the offerings to dealers, and with an increased demand from both mills and Open Hearth furnaces a further strengthening of the market has followed, and prices of Railroad Wrought and Iron Rails are higher. There is still some difficulty experienced in the movement of Scrap, which is reflected in the market by a firmer tone. The following are the prices per gross ton, Chicago:

Old Iron Rails.....	\$24.50 to \$24.75
Old Steel Rails, mixed lengths.....	18.50 to 18.75
Old Steel Rails, long lengths.....	22.00 to 22.25
Heavy Relying Rails.....	31.00 to 31.50
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	18.25 to 18.50
Mixed Steel.....	16.00 to 16.50

The following quotations are per net ton:

Iron Fish Plates.....	\$21.00 to \$22.00
Iron Car Axles.....	24.50 to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	20.50 to 21.00
No. 2 Railroad Wrought.....	18.25 to 18.75
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	16.50 to 17.00
No. 1 Bushing and Wrought Pipe.....	14.00 to 14.50
Iron Axle Turnings.....	14.50 to 15.00
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.25 to 14.75
Cast Borings.....	10.25 to 10.50
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Bolders, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	18.00 to 18.50
Stove Plate and Light Cast Scrap.....	13.50 to 14.00
Railroad Malleable.....	16.25 to 16.50
Agricultural Malleable.....	15.50 to 16.00

Metals.—Copper has not changed essentially during the week, but the tone of the market is less strong, and there is but little buying. Lake is still quotable at 14¾c. to 15c. in carload lots, and 15¼c. in a jobbing way. Pig Lead has been strong, but prices are entirely nominal in this market. Official quotations remain 4.60c. in 50 to 100 ton lots and 4.62½c. to 4.65c. in carload lots. Spelter has again advanced with a great demand, with sales at the close at 5.40c. for staples in carload lots. Sheet Zinc has remained firm at 6¾c., Chicago. Old Metals have been in better demand and strong, prices of heavy Cut Copper and Copper Bottoms having been advanced 1¼c. Heavy Cut Copper is now selling at 13c., Red Brass at 13c., Copper Bottoms at 11¾c., Lead Pipe at 4.35c. and Zinc at 4c., spot.

Coke.—While the local market is more amply supplied prices are still abnormally high for both Furnace and Foundry grades. Sales of single carload lots of Virginia Coke are made at \$9 to \$9.50, and Connellsville at \$10 to \$10.50, spot, track, Chicago.

The announcement is made that M. A. Hanna & Co. have closed their Chicago office, and the product of the furnaces of

the Pioneer Mining & Mfg. Company will be hereafter sold by the general sales department of the Republic Steel & Iron Company, Chicago.

The Carbon Steel Company of Pittsburgh, manufacturers of Locomotive, Boiler and Fire Box Steel Plates and other Shapes, have opened an office in room 1414, Fisher Building, Chicago, under the charge of Edward K. Harris.

Philadelphia.

FORREST BUILDING, March 31, 1903.

Opinions in regard to the course of the market are not of a very definite character. In many respects the outlook is excellent, in others there is a possibility that adverse influences will have to be overcome before there is clear sailing. The volume of business is undoubtedly the largest on record, upon which it is no easy matter to make further additions, particularly when prices, although not excessively high, are considerably above the normal. The average price for Pig Iron for the ten years from 1883 to 1892 was \$18.50 per ton, and from 1893 to 1902, inclusive, was about \$15, and for the entire 20 years the average was \$16.75, so that from that point of view prices now are relatively high, and considering that the tendency in all lines has been to cheapen the cost of production they are distinctly high. Labor and fuel and incidentals are a good deal higher than formerly, but improved methods and increased output more than offset these items, so that it is not safe to assume, as many do, that prices are not high. If it be true that they are above the normal, it is only a question of time when there will be a decline, but when that time will be no man knoweth. With anything like a fair chance, it is probable that we may go through all of 1903 without more than trifling deviations from to-day's prices, but contingencies, if not difficulties, have to be met during the next few weeks that are too serious and too uncertain to permit of positive opinions at the present time. The attitude of labor is one, the financial situation is another, and a little later on will be the crop conditions. Optimists dismiss these matters as being of no great importance, taking it for granted that everything will come out right and that prosperity will continue indefinitely. It is well to be hopeful, and there is certainly no reason for discouragement under present conditions, but, on the other hand, there is enough of uncertainty to warrant a careful and unprejudiced survey of the situation, both for and against. J. Pierpoint Morgan, who should be an excellent authority, is said to have made the following statement on Monday:

"It seems to me that the general pessimistic talk indulged in, not alone in foreign, but in local circles, is in no sense justified by the facts. It may be true, as some of the captious critics declare, that at the present moment there are in the market many undigested securities, but ought not the character of these securities to be taken into consideration in a broad or comprehensive view of the situation? Are these securities sound or are they unsound? Do they represent value or do they not? For what purpose have they been issued? Those are the questions. To my mind, and in my judgment, these new securities are essentially sound and stable, and those who have them are in no wise alarmed because of their holdings. Beyond all this, they are issued, not to build competing lines, but largely for the purchase of rolling stock and motive power and for the extension of other facilities necessitated by the necessary movement of the products of the country."

As regards developments during the past week, they really amount to very little. There is plenty of business, but with constantly increasing facilities for production, more business is required to maintain the equilibrium. It is difficult to determine whether this is being fully realized or not. Indications of scarcity are not as much in evidence as they were during a good portion of 1902, and if any serious interruption to consumption should arise from strikes, or from financial difficulties, or other unforeseen causes, the effects would be felt almost immediately. On the other hand, if there are no adverse developments, it is possible that another period of scarcity and premiums for prompt deliveries will be met with, and with such a narrow margin between supply and demand as now exists such a contingency is by no means improbable. As a matter of fact, it is hardly likely that things will remain on their present level, but whether the change will be for better or worse depends on the conditions to which we have referred, and which are as yet entirely problematical. Meanwhile, however, nothing has intervened to indicate any immediate change from the conditions which have prevailed during the past three or four weeks.

Pig Iron.—The market is so near like what it was last week that it may be considered unchanged. There is quite a good demand for deliveries during the second quarter of the year, and in some cases heavy purchases have been made for the last half, prices being firm for the first named and a little easy for the longer dates. Supply and demand are very evenly balanced, no pressure to sell and no difficulty in getting reasonably satisfactory deliveries. Under such con-

ditions it is no easy matter to say what the conditions may be a little later on. When the balance is as even as it is to-day it does not require much to effect a change, but, as previously stated, developments in the near future are so uncertain that it is impossible to say which end will be the one to go first. All that we do know is that there is a good market now, and if nothing unforeseen occurs the chances are favorable for its continuance, and less favorable conditions are contingencies rather than probabilities. Foreign markets are strong and it is increasingly difficult to import at prices to admit of a reasonable margin. Lots that are afloat or on the spot can be had at about last week's prices, but new purchases require new prices on this side. Low Phosphorus, American standard, would cost very close to \$23 on dock, duty paid, and Middlesbrough about \$19 for cargo lots; cash against documents. The advance on this class of material will clear the way for the expected increase by the American furnaces, so that there is nothing in sight yet to indicate lower prices except to a limited extent and for long deliveries. The usual prices for lots delivered in consumers' yards, Philadelphia, or nearby points are about as follows:

No. 1 X Foundry.....	\$23.50 to \$24.50
No. 2 X Foundry.....	22.25 to 22.50
No. 2 Plain.....	21.50 to 22.00
Gray Forge.....	19.50 to 20.50
Basic.....	20.00 to 20.50
Middlesbrough, No. 3.....	21.00 to 21.50
Scotch.....	22.50 to 23.50

Cargo lots, c.i.f.:

Low Phosphorus, 0.035.....	\$21.25 to \$21.50
Bessemer.....	20.25 to 20.50
Middlesbrough, No. 3.....	19.00 to 19.50

Billets.—There is an increasing scarcity of Steel and prices are higher and prompt deliveries hard to get at any price likely to be acceptable to buyers. Ordinary Soft Steel would cost \$33 and upward in buyers' yards, and German Open Hearth \$29 to \$30 on dock, duty paid. Prospects for supplies of Steel are somewhat disquieting to consumers, as it is very difficult to get satisfactory offers either as regards prices or deliveries.

Plates.—Business is maintained in large volume, but the mills are turning out so much that they have to hustle to keep their order books in good shape. There is therefore sharp competition for large orders, and in special cases prices have been shaded down to meet quotations made by Western mills. Raw materials are very high, however, and there is not much margin to manufacturers under present conditions. Ordinary quotations are about as follows, subject to slight reductions for special orders as above mentioned for nearby deliveries: Small lots, 2c. to 2.05c.; carload lots, 1/4-inch and thicker, 1.85c. to 1.90c.; Universals, 1.90c.; Flange, 2.10c.; Marine, 2.15c. to 2.20c.; Fire Box, 2.25c. to 2.30c.

Structural Material.—The demand has been a little slow during the past week, but this is probably due to the disturbed condition of labor among the bridge workers. There is a good deal of work on hand, however, and if deliveries are not interfered with the mills will have all they can do to complete their orders on time. Prices are steady at the official figures—viz.: Beams, Angles or Channels, ordinary sizes, 1.73 1/2c. to 1.78 1/2c., carload lots, as a minimum, with the usual addition for smaller quantities.

Bars.—Business in this department is not specially active, but the mills in most cases are fairly well employed. Prices are steady, but deliveries are easy, without quotable change in prices, which remain as last quoted, viz.: Steel Bars at 1.75c. to 1.85c., Refined Iron, 1.93 1/2c. to 1.95c. for carload lots, with the usual addition for smaller quantities.

Sheets.—There is a very active demand, and mills are running to their fullest capacity without being able to accumulate stock. Prices are firmer, and about 3c. is quoted for No. 28. other numbers quoted in proportion.

Old Material.—There is a very good demand, and prices are steady at unchanged prices, although imports of Steel Scrap are quite an important feature. Bids and offers are about as follows for delivery in buyers' yards:

Old Steel Rails.....	\$21.25 to \$21.75
Heavy Steel Scrap.....	20.75 to 21.25
Low Phosphorus Scrap.....	27.00 to 28.00
Old Steel Axles.....	26.00 to 27.00
Old Iron Rails.....	24.50 to 25.00
Old Iron Axles.....	30.00 to 31.00
Old Car Wheels.....	24.50 to 25.00
Choice Scrap, R. R. No. 1 Wrought.....	23.00 to 24.00
Country Scrap.....	21.00 to 22.00
Machinery Scrap.....	20.00 to 21.00
No. 2 Light Scrap.....	18.00 to 19.00
No. 2 Light (Ordinary).....	15.00 to 16.00
Wrought Turnings.....	16.50 to 17.00
Wrought Turnings, Choice Heavy.....	17.50 to 18.00
Cast Borings.....	11.50 to 12.00
Stove Plate.....	15.00 to 16.00

The Spring Valley Iron Company, Spring Valley, Pierce County, Wis., announce the opening of the Gilman mine, which is producing a brown hematite ore.

Cleveland.

CLEVELAND, OHIO, March 31, 1903.

Iron Ore.—The lake situation has been much relieved during the past week. What promised to be a long strife between the vesselmen and their employees, the mates and the longshoremen, ended on Saturday by an agreement as to the terms for the coming season. Two strikes that were threatened have been avoided. These strikes promised to tie up the entire lake commerce for the month of April. Vesselmen had started to figure on possible higher rates as an immediate result of this change in the length of the season. The principal matters in regard to the employment of help on board the ships and the docks having been settled, the question of rates arises. It has been understood for several weeks that the shippers were willing to pay 85c. from Duluth to Ohio ports, and this was the first offer expected. The vesselmen, however, are standing together for 90c. They make a plea that the cost of operating the boats has been so increased that the 10c. a ton advance which the shippers propose will not be adequate. Shipment from the lake docks to the furnace stock piles continues brisk, but it is evident that much Ore will be left on the docks here this spring.

Pig Iron.—Foundry grades are beginning to pick up some for second half delivery. So far the sales are somewhat limited, being confined at the outside to 500, 750 or 1000 ton lots. There are inquiries for larger amounts, but none of these have developed into anything more material. The consumers are not entirely rid of the belief that the market will afford a lower list of prices, but producers have held firm, not being anxious to make sales for second half until later. Buying for spot shipment is spasmodic. Prices on Foundry Iron are: No. 2, from Northern furnace, \$22, f.o.b. furnace, in Southern Ohio, for first half delivery, and \$21 to \$21.50 for the same grade for second half delivery, Valley furnace. The demand for Basic Iron has not been as lively as was expected, especially for second half delivery. The consumers are taking what material is being offered for first half and are making shift with it, but it is hardly up to their requirements. The business that is being done is at the old prices of \$21.50 to \$22 for first half and \$20 for second half delivery, all quotations being Valley furnace, base. There is hardly enough Bessemer business being done to establish a market. Prices have not changed, however, and a nominal quotation is possible of \$21.50 to \$22, Valley furnace, for first half and \$20.50 to \$21 for second half. Production is very active, although not normal as yet, the Coke supply still hindering. The consumption is heavy. Some new furnaces in this territory are about ready to blow in.

Finished Iron and Steel.—The market, as a whole, has been rather quiet, more so in fact than in recent previous weeks. The Bar Iron trade commands attention with some good business coming in and with the mills making no effort to obtain more. Mills are quoting 1.85c., Youngstown, and jobbers 2c., Cleveland, with no difficulty to make sales at those prices. The price of Steel Bars is strong. Rumors of coming advances are persistent. A meeting of the Bar Association is to be held next week, at which the price policy will be discussed and decided. In the meantime business is brisk, but not overly active. A good many of the big agricultural implement concerns have not covered their needs as yet. Prices hold as heretofore at 1.60c., Pittsburgh, for Bessemer and 1.70c., Pittsburgh, for Open Hearth. The Sheet trade is gaining in strength. There have been no advances in prices, but the market has simply stiffened. Quotations are 3.10c. to 3.25c. for No. 27 out of stock Black Sheets, and with the same gauge being quoted at 2.85c. to 2.95c. at the smaller mills. The Structural trade seems to have strengthened with brighter prospects ahead. Several buildings in Cleveland, which have been under contemplation, are again discussed and the supply of Steel is being negotiated for. Good sized orders are being supplied from the larger mills, which offer from 30 to 60 days delivery, thus almost cutting out the smaller mills, which have been getting premiums and are only finding small lots now. The jobbers are doing a diminishing business out of stock at 2.25c. The association price of 1.60c., Pittsburgh, prevails. The Plate trade is strong, with heavy specifications on old contracts. These mills are catching up on their orders and this is somewhat diminishing the volume of premium business that is being done, and the smaller mills are not quite so independent as they were recently. The larger mills are adhering to the quotation of 1.60c., Pittsburgh, and the smaller mills are getting 2c. The Rail trade is fairly active with some small business being done from time to time, but no large contracts have been closed recently. Prices remain as they have been, \$28 for large tonnage of Standard Rails and \$36 for Light Rails. This week has seen production active but deliveries poor, on account of the railroad situation, which does not seem to improve very much. It is constantly difficult to get fuel and to keep the yards free when the material has been produced. Shortage of power is the cause.

Old Material.—The market has been firm, with the dealers cautious. The point has been reached where the consumers absolutely refuse to pay any higher prices. There is still a good demand for Steel Scrap and not very much

of it. Prices have been firm but have not changed. Quotations are continued as follows: No. 1 Wrought, \$19.50, net; Iron Rails, \$25.50, gross; Iron Axles, \$27.50, net; Wrought Turnings, \$14.50, net; Cast Borings, \$12, gross; Car Wheels, \$22.50, gross; Heavy Melting Steel, \$20.50, gross; Old Steel Rails, \$21, gross.

Birmingham.

BIRMINGHAM, ALA., March 30, 1903.

To correct wrong impressions concerning the additions to be made to furnace capacity in this district, it may be well to state that during the month of April the Consolidated Coal & Iron Company will have their new furnace at Gadsden in commission, and the Central Coal & Iron Company, at Tuscaloosa, will be making Iron with their furnace, just completed. Their capacity is 250 and 300 tons. By the middle of the summer they will be reinforced by the furnace of the Alabama Steel & Wire Company, at Gadsden. To these three furnaces add one each for the Tennessee, Woodward and Lookout Mountain companies, and one for the Elliott interests at Gadsden, and the total makes a certain increase of seven furnaces with capacity of each ranging from 250 to 350 tons, by the end of the year. But the output of only three can be counted on as being available for any material part of the year. Besides these furnaces there is talk of four more to be built at Gadsden and one more at Tuscaloosa, making 12 in all to be added to our productive capacity. But the time in which five of them are to be erected is an unknown quantity to even the projectors. They will not be available for at least a year. There are others talked of, but talk is cheap. Their foundations have not yet been laid.

There has been a good inquiry for Steel and a very fair demand at enhanced prices, values ranging from \$34 down to \$32 for Billets, depending upon specifications of orders. At present the repairs the furnaces are undergoing restrict output.

There has been an easing up in the price of Coke and \$6 can now be reported as outside price. Values vary from \$5.50 up to \$6 for prompt and nearby delivery, and for long delivery \$4.50 is named as an acceptable price. Coal is still in good demand and \$1.50 to \$2 is given as the price at the mines, depending upon the character of the order and conditions. A large Ore contractor gives the price of Red or Hard Ore as 80c. to \$1, and \$1.75 to \$2.25 as the price of Soft or Brown Ore, with a good demand for all that can be produced.

The Alabama Coal, Mineral & Lumber Company were incorporated the past week. Their possessions cover 2000 acres of mineral lands in Shelby County, and options that they have under consideration may be accepted and add largely to their holdings. They are capitalized at \$30,000 and may increase the amount. Their headquarters will be at Reading, Pa.

The Southern Pipe & Foundry Company were also incorporated, being capitalized at \$35,000. The incorporators are local and foreign holders. It will be located at North Birmingham.

The real estate purchased by the Southern Railway Company at North Birmingham some time since, and of which mention was made at the time in these letters, is now being prepared for extensive switching yards and for the accommodation of repair shops. The grounds will be prepared for the accommodations required for 150 trains, and there will erected machine, blacksmith and carpenter shops. The shops at Avondale will be continued, for to abandon them would be surrendering title to the land on which they stand.

Another visit of officials of the Illinois Central Railroad the past week has revived the gossip concerning their efforts to obtain an entrance here. While the officials are very reticent concerning their intentions there can be no doubt as to them; and the time now is not far distant when they will be running their trains in and out of this place. They won't wait for their own tracks to be completed before they commence business. The contract for the connecting link of the road to Gadsden has been let by the Louisville & Nashville Railroad, and it will not be long before we will have direct connection with that thriving center of progress and have the benefit of access to a section rich in both Iron and Coal.

Plans have been drawn for a new 12-story building to be erected here, in which Atlanta capital will be equally interested with local capital. The projectors have kept their plans a profound secret, and its location has not yet been divulged. Negotiations are pending, in which are involved other important enterprises, but nothing definite can yet be said of their material realization. There is no cessation so far of the improvements that these letters have been so long chronicling. On every hand, and in every line, it is one constant, steady advance. We are growing together fast; and in a very few years from Bessemer and Ensley to East Lake will be as one city, and the mother and her children will be united and acknowledge the same name.

St. Louis.

CHEMICAL BUILDING, April 1, 1903.—(By Telegraph.)

Pig Iron.—Conditions in the Pig Iron market show a considerable change for the better, and the market is now dominated by an active inquiry and some fairly lively buying for shipment covering the next two or three months for all grades. Considerable inquiry and sales are cropping up for last half delivery. The call for special Irons is quite pronounced and several round sales of Car Wheel Iron have been placed. Basic Iron sales aggregating 10,000 or 15,000 tons have been closed since our last report, and a further inquiry of liberal order is coming to hand from those whose requirements are not covered. The impression expressed in the trade points toward the anticipation of a large increase in the consumptive demand. It has been the policy of the larger consumers at this point to keep a liberal stock in their yards as a reserve, but this has been largely drawn upon and consequently in a good many cases has been very nearly exhausted, and will in the natural course of affairs have to be built up again. The trade express the opinion that the present range of prices will very materially check the importation of foreign Irons. There seems to be considerable pressure for shipments, and owing to improvement in the transportation facilities better satisfaction is being felt all around. The Coke situation shows betterment, due to improvement in the matter of deliveries. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry.....	to \$21.00
Southern, No. 2 Foundry.....	to 21.25
Southern, No. 3 Foundry.....	to 20.75
Southern, No. 4 Foundry.....	to 20.25
No. 1 Soft.....	to 21.75
No. 2 Soft.....	to 21.25
Gray Forge.....	to 19.75
Southern Car Wheel.....	to 28.50
Malleable Bessemer.....	\$24.75 to 25.25
Ohio Silvery, 8 per cent. Silicon.....	33.00 to 33.50
Ohio Strong Softeners, No. 1.....	to
Ohio Strong Softeners, No. 2.....	to

Bars.—Trade conditions show little change either way or the other over that reported last week. The jobbing trade are handling a fairly steady volume of business with a moderate new inquiry coming to hand. Prices are very steady around the present basis. We quote, from the mills: Iron Bars, 1.85c. to 1.90c.; Steel Bars, 1.82½c. to 1.90c., half extras. The jobbing trade continue to quote 2.15c., base, for both Iron and Steel Bars to their larger trade, and 2.25c. in small lots from store.

Rails and Track Supplies.—While the volume of business in this department of the market is large at this time conditions are of a somewhat more quiet order than has been recently prevailing. Mill representatives are very well satisfied with the amount of business in hand, as it is sufficient to severely tax the productive capacity of their plants for months ahead. Prices show firmness for all that comes under this head.

Angles and Channels.—Jobbers report a fairly active amount of trade for Small Angles and Channels, and it is difficult for them to receive full requirements from the mills. For material of this class 2.25c. to 2.40c., base, continues to be quoted.

Pig Lead.—Pig Lead has continued in very steady demand and it is said that offerings are on a limited scale. We quote Chemical and Desilverized at 4.57½c., but in cases where quick shipment is specified a premium over these figures is generally asked.

Spelter.—While quotations on a basis of 5.40c. are being made for future deliveries, the metal is said to be exceedingly scarce. Some stray cars have lately brought all the way from 5.75c. to 6c., but it is said that even at this high level the market is very bare of offerings.

F. A. Burr, general sales agent of the Tennessee Coal, Iron & Railroad Company, is paying a visit to St. Louis on business in the interest of the Steel and railroad supply trade.

Cincinnati.

FIFTH AND MAIN STS., April 1, 1903.—(By Telegraph.)

It is a long lane that has no turning, and the continued dullness in the Pig Iron market certainly took a turn that was startling and unexpected or not according to the hindsight of the various furnace representatives at this point. There have been some vague rumors within the last two or three days regarding a cut that was to be made in Foundry Iron by the Southern Association furnaces, but that the cut was actually made was not announced with authority until to-day, when the scale was lowered from the basis of \$18.50, Birmingham, for No. 2 Foundry to \$17.50, and Gray Forge took a tumble from \$17.50 to \$16, same basis. And now in the face of this reduction comes the word that several outside furnaces are offering their product on the basis of \$17, Birmingham, for No. 2. The general opinion here is extremely adverse to the move, and while it has been conceded that Iron was on too high a basis in comparison with the

Northern brands, yet the belief is that the cut should not have been made in this way and at this time. It has probably had the effect of heading off the railroads in their anticipated advance of freight rates south of the Ohio River. Another effect it will very likely have is the checking of any incipient buying movement which may have been developing. Only two days ago the traveling men were strenuously insisting that a lower basis than \$18 to \$18.50 was a present impossibility, and some little business had been transacted up to the very hour almost of the announcement of the \$1 cut. The course of the market will be watched here with much interest, and there are not lacking prophets who declare that it is now almost beyond the power of the furnaces to hold the market where they have placed it. Actual business transacted during the past week has been light, though orders for considerable Basic and Charcoal brands, as well as irregular grades, have passed through to the books of the agencies with headquarters here. The understanding is that Iron is going forward very rapidly on old contracts, and except for activity in this line another quiet week is anticipated. Freight rates from the Hanging Rock district, \$1.15, and from Birmingham to Ohio River points \$3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1.....	\$20.75 to \$21.25
Southern Coke, No. 2.....	20.25 to 20.75
Southern Coke, No. 3.....	19.75 to 20.25
Southern Coke, No. 4.....	19.25 to 19.75
Southern Coke, No. 1 Soft.....	20.75 to 21.25
Southern Coke, No. 2 Soft.....	20.25 to 20.75
Southern Coke, Gray Forge.....	18.75 to 19.75
Southern Coke, Mottled.....	18.75 to 19.75
Ohio Silvery, No. 1.....	30.15 to 31.15
Lake Superior Coke, No. 1.....	23.15 to 24.15
Lake Superior Coke, No. 2.....	22.15 to 23.15
Lake Superior Coke, No. 3.....	21.15 to 22.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$27.25 to \$28.25
Lake Superior Car Wheel and Malleable	27.50 to 28.50

Plates and Bars.—We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.92c., with half extras; same, small lots, 2.20c., with full extras; Steel Bars, carload lots, 1.73c., with half extras; same, in small lots, 2.20c., with full extras; Plates, ¼-inch, in carload lots, are still nominally 1.70c.; 3-16 inch, 1.80c.; Beams and Channels, 1.70c., base.

Old Material.—We quote dealers' buying prices as follows, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, \$20 per net ton; Cast Scrap, \$17.50 per net ton; Iron Rails, \$23 per gross ton; Long Steel Rails, \$22.50 per gross ton; Short Steel Rails, \$18 per gross ton; Iron Axles, \$28 per net ton; Car Wheels, \$24 per gross ton; Low Phosphorus Steel, \$25.50 per gross ton; Heavy Melting Steel, \$22 per gross ton.

The Labor Troubles in the Structural Trade.—The labor troubles in the structural trade, which have grown out of the controversy between some of the officials of the union and American Bridge Company, are not so important as would appear from the sensational articles printed on this subject in the daily newspapers. The only cities in which any serious interference with the erection of structural work now exists are New York and Buffalo. At other points, with the exception of possibly one or two small towns, the American Bridge Company are conducting their operations without any special difficulty. The workmen generally are not in sympathy with the action of their superior officers in endeavoring to foment a general strike. The efforts in this city to bring about a sympathetic strike in the building trades for the purpose of exerting greater pressure upon the American Bridge Company seem unlikely to be successful. The leaders of the local unions in these trades are not desirous of checking building operations and causing the members of their unions to be thrown idle at this time to assist a strike which does not seem to them to be warranted.

The American Bridge Company, although well supplied with contracts which will keep their works running for many months and therefore seeking no quick time work, do occasionally accept an order which requires sharp delivery. They made a record in this respect during the past month. Within ten days after receiving an order for the steel frame for a large manufacturing building, the shipment was made covering the material complete. This is simply mentioned as an illustration of the systematic methods which have been put in practice by this large corporation.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, April 1, 1903.

Pig Iron.—At a meeting of the Southern furnace owners, held at Birmingham, Ala., on Saturday, March 28, a cut of \$1.50 a ton was made on Foundry and Forge Iron. This was done for the purpose of inducing large consumers to take hold for the second half, and also to shut out foreign Iron if possible, which has been coming into Pittsburgh and the East in large quantities for some time. In order to more effectively accomplish this a differential in prices of \$1 a ton has been made on Foundry and Forge Iron for shipment into Pittsburgh and the East. The new prices, effective April 1, for Iron shipped into Pittsburgh and the East, are as follows: No. 2, \$16.50; No. 3, \$16; No. 4, \$15, and Gray Forge, \$15. The rate to Pittsburgh is \$4.85 a ton, and No. 2 Southern Foundry is being offered for shipment over the next three or four months at \$20.85 and Gray Forge at \$19.85. What effect this will have on the general Pig Iron situation remains to be seen, but it may cause some disturbance in contracts for Iron which have been placed at higher figures. A fair amount of Bessemer and Basic Iron is changing hands, sales in March by the Valley furnaces and outside interests approximating 100,000 tons. Bessemer Iron for prompt shipment is about \$21, at furnace, for small lots. For shipment over last six months \$20, at furnace, is generally quoted. Some Bessemer Iron has been sold for shipment over last half and into first quarter, at a price slightly under \$20 a ton. Northern Forge is held at \$20.75 to \$21, Pittsburgh, but in view of the cut in price of Southern Forge, Northern brands may go off a little. Northern No. 2 Foundry Iron, for shipment over last six months, is held at \$21, at furnace, or \$21.85, Pittsburgh. It is said that some contracts have been made on this basis.

Steel.—The market is somewhat quiet, only small lots changing hands, but prices are firm. Bessemer and Open Hearth Billets held at \$30 to \$31, maker's mill, for Ordinary Carbons. On a large tonnage of either Bessemer or Open Hearth, and for extended delivery, possibly a little better price would be made. The supply of Steel is short; very little is being offered in the open market.

(By Mail.)

The freight congestion on the railroads, which was such a menace to business during the winter months, has largely disappeared, and freight is now moving more promptly than for a long time. However, it still takes the utmost efforts of the railroads to keep the situation cleared, and last Sunday 91 solid freight trains were sent East over the Pennsylvania Railroad from the Pittsburgh district. In addition 60 freight trains came into Pittsburgh from Eastern points. Now that the railroad situation is better, the Iron trade is confronted with another serious matter, that being the labor question. The strike of the Structural Iron workers has spread, and threatens to tie up work all over the country. It is regrettable that this trouble has arisen, for if it is continued it is bound to hurt business very seriously. The Iron trade continues in very satisfactory shape, demand being good and prices strong. Nothing of special interest has developed in the past week, the amount of Pig Iron and Steel changing hands being relatively small. All negotiations between the Steel Corporation and the Bessemer Furnace Association for Metal for last half of the year have been called off. In Finished Material we note a decline in the demand for Structural Steel, probably due to threatening labor troubles, which will postpone many enterprises. Cut Nail manufacturers have advanced prices 5c. per keg.

Ferromanganese.—There is an active demand for Ferro, and several good sized lots of English have been sold at \$50 a ton, delivered, at buyer's mill. Carloads bring about \$52, and small lots \$55, delivered.

Steel Rails.—Some of the Rail mills are now sold up to the end of the year, and are practically out of the market as sellers. Very few new orders are being placed, and these mostly for small lots. We quote at \$28, at mill, for Standard Sections in 500-ton lots.

Muck Bar.—With most sellers of Muck Bar \$35.50 to \$36 is asked. One or two sellers continue to take business at \$35, f.o.b. Pittsburgh. Eastern Muck Bar is offered here at lower prices.

Spikes.—We note that prices on Spikes have recently advanced, due to heavy demand and high prices of Steel. We quote Railroad and Boat Spikes at 2.25c. per keg, f.o.b. Pittsburgh.

Hoops and Bands.—Demand continues good, and the leading mills have a large tonnage on their books. Prices are firm and, we are advised, are being firmly held. We quote Cotton Ties at 88c. in 5000-bundle lots and over, and 91c. for less quantities, f.o.b. mill. Steel Hoops are 1.90c. for 250-ton lots or over, and 2c. in small lots, full extras. Bessemer brands are 1.60c. up to No. 12 gauge, and Open Hearth 1.70c., f.o.b. mill, extras as per Steel Card.

Rods.—The market for Rods is firm, ordinary Bessemer being held at \$37 to \$37.50, at mill.

Plates.—There seems to be no let up in demand for Plates, and large buyers who are unable to have their contracts filled by local mills are placing orders with Eastern makers. Large inquiries are in the market, and Plates for prompt delivery still command premiums in prices. Most of the local mills are practically sold up for the next four or six months and some for longer periods. Prompt Plates bring 1.75c. and up to 1.90c., depending on amount of tonnage and deliveries wanted. Official prices, at which most of the tonnage is taken, are as follows: Tank Plate, 1/4-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Merchant Steel.—There is a good demand for nearly all kinds of Merchant Steels, and several of the large agricultural implement makers have recently placed contracts covering requirements into next year. Prices are firm and are being fairly well maintained. We quote: Fire Steel, 1.80c. to 1.90c.; Open Hearth Steel, ordinary grades, 1.70c. to 1.80c.; Open Hearth Spring, 2.25c. to 2.35c.; Cant Hook Steel, 2.50c.; Plow Slabs, Bessemer, 2.50c.; Plow Slabs, Open Hearth, 3.75c.; Tool Steel, ordinary grades, 6 1/2c. and upward; Cold Rolled Shafting, 42 per cent. off in less than carloads, and 47 per cent. in carloads, delivered in base territory.

Sheets.—The Sheet market is in better shape, both as regards demand and prices, than for some time. Prices are hardening and special concessions obtainable some time ago have been withdrawn. It is believed that some of the independent mills will be in much better shape before long as regards supply of Steel. Projects now under way with this in view have good prospects of success. As noted above, prices are very firm, and we quote as follows: Nos. 22 and 24, box annealed, one pass through cold rolls, 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. These prices are for carloads and larger lots and are minimum of the market, jobbers charging the usual advances for small lots. Galvanized Sheets are now 75 and 10 off, which is equal to 3.60c. for No. 27 and 3.85c. for No. 28. These prices are for carloads and larger lots, and are f.o.b. at mill.

Structural Material.—The strike of the Structural Iron Workers is already adversely affecting the placing of contracts and no large jobs have recently been given out in this district. A good deal of work is being placed in other sections, the leading interest having taken several large contracts for extreme Western points. There is a good run of small orders ranging from 100 to 500 tons. There is practically no delay now in getting deliveries of Structural Steel and we quote: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Iron and Steel Bars.—While tonnage being placed in Steel Bars is not as large as could be desired, and is not as heavy as last year, the mills are pretty comfortably filled, but deliveries can be had within from two to four weeks from time of placing the contract. Tonnage in Iron Bars is good and the market is firm. We quote Iron Bars at 1.85c. to 1.90c., Pittsburgh, in carload lots and 1.95c. in small lots, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Skelp.—The price of Skelp has not materially changed in the last week or two, but most of the mills are sold up for the next two or three months, and Both Iron and Steel Skelp are scarce. We quote Grooved Iron and Steel Skelp at 2c. to 2.05c., and Sheared at 2.10c. to 2.12 1/2c., Pittsburgh, or 2 per cent. off for cash in 30 days.

Spelter.—For spot shipment Spelter is scarce and commands a premium in prices. Prime Western grades for future delivery are held at 5.38 1/2c., while spot is about 5.43 1/2c., Pittsburgh.

Merchant Pipe.—The Pipe market is firm, a good many orders being placed and the tonnage being considerably larger than at this time last year. The mills are well filled up for the next several months. A reported consolidation of three or four of the independent Pipe mills is not verified. Discounts to consumers in carloads are as follows:

	Merchant Pipe, Full weight				Full weight			
	Merchant Pipe, Steel.	Wrought Blk. Galv.	Iron.	Steel Pipe.	Wrought Blk. Galv.	Iron.	Steel Pipe.	Wrought Blk. Galv.
1/4, 1/2 and 3/4.....	68	58	65	55	67	57	64	54
1 1/2.....	70	60	67	57	69	59	66	56
3/4 to 6.....	75	65	72	62	74	64	71	61
7 to 12.....	69	59	66	56	70	60	67	56

We may note, however, that the outside Pipe mills are quoting slightly lower prices on Iron Pipe than are given above.

Boiler Tubes.—Demand is good and prices are fairly firm. Consumers' discounts in carloads, which are occasionally shaded, are as follows:

Size.	Steel.	Iron.
1 to 1 1/2 inches inclusive.....	42 1/2	36 1/2
1 1/2 to 2 1/2 inches inclusive.....	55 1/2	35 1/2
2 1/2 to 5 inches inclusive.....	61	45 1/2
6 to 13 inches inclusive.....	55 1/2	35 1/2

Connellsville Coke.—Deliveries of Coke are better than for months, and at this writing not a single furnace in the Pittsburgh or Valley district is suffering for lack of fuel. Output of Coke last week in the Upper and Lower Connells-ville region was 297,600 tons, and shipments were larger than for a long time. Strictly Connells-ville Furnace Coke for spot shipment is offered at \$5 a ton, and on contracts for delivery over last six months at \$3.75 to \$4 a ton. Foundry Coke on contracts is about \$5 a ton and \$6 for spot shipment. West Virginia Furnace Coke is offered at \$3.50 a ton at oven on contracts.

Iron and Steel Scrap.—A good deal of Scrap is moving, and the tone of the market is firm. Heavy Melting Stock is scarce, and readily brings \$21.50 in gross tons. No. 1 Pipe and Tank Iron, \$18 to \$18.25, net tons; Cast Iron Borings, \$11.75 to \$12, gross tons; No. 1 Cast Scrap, \$20.75 to \$21, gross tons; No. 1 Wrought Scrap, \$21, net tons; Iron Axles, \$30 to \$30.50, gross tons; Steel Axles, \$26 to \$26.50, gross tons; Old Car Wheels, \$24 to \$24.50, gross tons.

PITTSBURGH REMOVALS.

This year many of the prominent Iron and Steel firms in the Pittsburgh district are moving their offices, most of them going into the new 24-story Farmers' Bank Building, located at Fifth avenue and Wood street, Pittsburgh. A list of those who have moved in the past week into the Farmers' Bank Building is as follows:

Pittsburgh Filter Mfg. Company, from Empire Building to rooms 1501-1502.

Allegheny Steel & Iron Company, from Park Building to rooms 818-821.

Petroleum Iron Works Company, from the Penn Build- ing to rooms 401-402.

Monongahela Foundry & Furnace Company of Monon- gahela City, Pa., have opened a new office in room 803.

A. F. Baumgarten & Brothers have removed from Park Building to room 902.

Grove & Knox, manufacturers' agents, from People's Bank Building to room 915.

A. R. Peacock, from Carnegie Building to rooms 916-918.

Atwell Machinery Company, from Hamilton Building to room 923.

Keystone Engineering Company, from Bijou Building to rooms 1207-1208.

E. Dreifus, Trimble & Co., dealers in Pig Iron, Steel and Scrap, from Lewis Building to rooms 1220-1221.

The W. Y. Bygate Company, from Ferguson Building to room 1323.

West Leechburg Steel & Tin Plate Company, from Sec- ond National Bank Building to rooms 1413-1414.

Pittsburgh Spring & Steel Company, 313 Sixth avenue, to room 1415.

Samuel Diescher & Sons, from Hamilton Building to rooms 1503-1506.

Wheeling Mold & Foundry Company, from Empire Build- ing to room 1515.

Harbison-Walker Refractories Company, from Park Building to rooms 1701-1726, this concern occupying a whole floor and part of another floor.

Howard M. Hooker & Co., dealers in Pig Iron and Coke, from Park Building to room 1718.

Lawrence C. Phipps, from Carnegie Building to rooms 1721-1722.

Pressed Steel Car Company, from Tradesmen's Building to rooms 1901-1926, this concern occupying an entire floor.

Pilling & Crane, Pig Iron, Steel and Cinder, George B. Nutt, resident agent, from Lewis Building to room 2001.

Rogers, Brown & Co., Pig Iron and Coke, from Park Building to rooms 2008-2009.

Kittanning Iron & Steel Mfg. Company, operating Re-becca Furnace at Kittanning, Pa., have opened a Pitts- burgh office in room 1203.

Joseph Dixon Crucible Company have removed from Lewis Block to room 2213.

L. F. Huntington, formerly in charge of the Cincinnati office of J. K. Dimmick & Co., has been placed in charge of the Pittsburgh office, with headquarters in the Murtland Build- ing, succeeding George S. Griscom, Jr., resigned.

The offices of Thomas A. Mack & Co., dealers in Pig Iron, have been removed from the Empire Building to the Farmers' Bank Building, Fifth avenue and Wood street, Pittsburgh.

The offices of Matthew Addy & Co., Pig Iron and Steel, Eliot A. Kebler, resident agent, have been removed from Second National Bank Building to 620 Farmers' Bank Building, Pittsburgh.

The Metal Trades Convention.

(By Telegraph.)

BUFFALO, N. Y., April 1, 1903.—From every standpoint the fifth annual convention of the National Metal Trades Association, which opened at the Iroquois Hotel this morning, promises to be the most important meeting ever held by this organization. The routine business to be transacted is of much importance, and many of the topics scheduled for discussion will call forth most interesting debate. But far more important to employers at large throughout the country is a plan which is to be presented advocating a National Federation of Employers. The plan is to organize employers or manufacturers in all branches of industry throughout the country on almost precisely the same lines as those on which the employees are now organized. During the last few years many local defense associations of employers have been formed. Thus far they are all working independent of one another. It is now intended to formulate a plan whereby this movement of local associations will be greatly extended and to arrange relationship with central bodies in the various trades, who in turn will be arms of one national association. It will be seen that the functions of the proposed National Federation will correspond to those of the Central Federation of Labor, securing for employers the advantages now enjoyed by organized labor, and the successive steps of organization will unite the individual employer with the national body. It is suggested that the National Association of Manufacturers act as the National Federation, and that the various trades and local associations maintain their individuality, but that by common consent a basis of co-operation be determined upon. This plan secured the indorsement of the Administrative Council of the National Metal Trades Association at their session here yesterday, and present indications point to a hearty indorsement of it by the members of this association when it is brought before the convention. "About all of the members of our organization are members of the National Association of Manufacturers, which is to meet at New Orleans," said Vice-President Du Brul of the Metal Trades Association to a representative of *The Iron Age* this morning, "and many who will be in attendance at our convention will also attend the one at New Orleans. We will give the Federation and central ideas of organization a strong impetus at our convention, and we will recommend to the New Orleans Convention the real necessity of furthering this idea, and will suggest large appropriations from that organization to our own and kindred organizations that manufacturers everywhere may be induced to organize on the same lines that their employees are organized and like their employees for mutual protection, and all that goes with good organization. Our Executive Committee will recommend to our convention the appropriation of a large sum of money for the purpose of sending good speakers and organizers into the different fields, and we will lend the financial and moral support of our organization to the furtherance of the idea of local and State organization among manufacturers."

The following members were present at the opening session:

S. W. Watkins, Christensen Engineering Company, Milwaukee, Wis.
E. F. Du Brul, Miller, Du Brul, Peters Company, Cincinnati, Ohio.
A. H. Bullard, Bullard Machine Tool Company, Bridgeport, Conn.
W. B. Payne, Payne Company, Elmira, N. Y.
Robert Wust, secretary, Cincinnati, Ohio.
M. H. Barker, American Tool & Machine Company, Boston, Mass.
H. N. Covell, Lidgerwood Company, Brooklyn, N. Y.
W. P. Eagan, F. W. Wolf Company, Chicago, Ill.
F. B. Polson, Polson Iron Works, Toronto, Canada.
Lewis Saring, Denver Engine Company, Denver, Col.
D. J. Kilby, Kilby Mfg. Company, Cleveland, Ohio.
T. Davenport, Norwalk Iron Works, South Norwalk, Conn.
M. A. Reeves, Reeves Pulley Company, Columbus, Ind.
F. W. Boye, Jr., Schumacher & Boye, Cincinnati, Ohio.
C. M. Stamp, C. & G. Cooper Company, Mount Vernon, Ohio.
R. L. Kenah, Jr., Pierce-Crouch Engine Company, New Brighton, Pa.
Wm. Medart, Medart Patent Pulley Company, St. Louis, Mo.
Geo. T. Bliss, Erie City Iron Works, Erie, Pa.

J. V. Wright, National Cash Register Company, Dayton, Ohio.
G. T. Gilbert, Michigan Bolt & Nut Works, Detroit, Mich.
O. B. Kinnard, Kinnard & Haines Company, Minneapolis, Minn.
W. H. Pfahler, Abram Cox Stove Company, Philadelphia, Pa.
J. W. Gardner, Gardner Governor Company, Quincy, Ill.
G. F. Steadman, Curtis Mfg. Company, St. Louis.
Alex. I. Lewis, Michigan Brass & Iron Works, Detroit.
L. A. Strong, Eaton, Cole & Burnham, Bridgeport, Conn.
A. H. Folger, the Lockwood Mfg. Company, East Boston, Mass.
C. F. Mayer, Rahn, Mayer, Carpenter Company, Cincinnati.
H. Ritter, Lunkenheimer Company, Cincinnati, Ohio.
N. Du Brul, Miller, Du Brul, Peters Company, Cincinnati, Ohio.
E. H. Hargrave, Cincinnati Tool Company, Cincinnati, Ohio.
T. C. Hobart, Triumph Electric Company, Cincinnati, Ohio.
H. M. Norris, Bickford Drill & Tool Company, Cincinnati, Ohio.
J. O. Thorn, Metallic Roofing Company, Toronto, Canada.
T. L. Greenwald, I. & E. Greenwald Company, Cincinnati, Ohio.
L. D. Reilly, Rochester, N. Y.
John D. Hibbard, the John Davis Company, Chicago, Ill.
F. K. Copeland, Sullivan Machinery Company, Chicago, Ill.
Fred. F. Stockwell, Barbour, Stockwell Company, Cambridge, Mass.
John E. Lynch, Hodge Boiler Works, Boston, Mass.
Chas. F. Elmes, Chas. F. Elmes Engineering Works, Chicago.
H. H. Latham, Latham Machinery Company, Chicago.
W. H. Stevenson, Norwood Engine Company, Florence, Mass.
E. W. Knotts, L. Booth Company, Pittsburgh, Pa.
H. Falkenau, Falkenau-Sinclair Company, Philadelphia, Pa.
F. Macomb Cresson, Geo. V. Cresson Company, Philadelphia, Pa.
John Oddsit, Hornellsville Foundry Company, Hornellsville, N. Y.
W. D. Sayle, the Cleveland Punch & Shear Works, Cleveland, Ohio.
Walter M. Bacon, American Tool & Machine Company, Boston, Mass.
C. Birmingham, Canadian Locomotive Company, Kingston, Ont.
W. L. Pierce, Lidgerwood Mfg. Company, New York.
Chas. E. Hildreth, P. Blaisdell & Co., Worcester, Mass.
P. G. March, Cincinnati Shaper Company, Cincinnati, Ohio.
Chas. E. Thomas, Cleveland Punch & Shear Works Company, Cleveland, Ohio.
Geo. A. Lautz, Niagara Machine Tool Works, Buffalo, N. Y.
R. I. Clegg, *Iron Trade Review*, Cleveland, Ohio.
H. S. Teal, United States Headlight Company, Buffalo.
James Gleason, Gleason Tool Company, Rochester, N. Y.
W. B. Cowles, the Long Arm System Company, Cleveland, Ohio.
Fred. A. Schiffer, Marine Eng. & M. Company, Harrison, N. J.
Wm. Lodge, Lodge & Shipley Company, Cincinnati, Ohio.
W. R. Wood, Lodge & Shipley Company, Cincinnati, Ohio.
M. E. Kennedy, Kennedy Valve Company, Cossack, N. Y.
James Eastwood, Benjamin Eastwood Company, Paterson, N. J.
S. P. Egan, J. A. Fay & Egan Company, Cincinnati, Ohio.
C. S. Yarnell, Moore Carving Mach. Company, Minneapolis, Minn.
Arthur E. Jones, J. A. Fay & Egan Company, Cincinnati, Ohio.
J. D. Derby, Manning, Maxwell & Moore, New York.
P. B. Kenney, Seneca Falls Mfg. Company, Seneca Falls, N. Y.
H. M. Kelley, the Lloyd Booth Company, Youngstown, Ohio.
E. E. Bartlett, the Lloyd Booth Company, Boston, Mass.
Henry F. Arnold, American Tool & Mach. Company, Boston.
A. M. Powell, Woodward & Powell Planer Company, Worcester, Mass.
Paul Blatchford, secretary Chicago Metal Trades Association, Chicago.
H. E. Goodman, Goodman Mfg. Company, Chicago.
Henry M. Leland, Leland-Faulconer Mfg. Company, Detroit.
E. P. Robinson, the Atlantic Works, Boston.
W. A. Jones, W. A. Jones H. M. Company, Chicago.
Geo. Rudge, Jr., Enterprise Boiler Company, Youngstown, Ohio.
R. J. Whyte, the Frost & Wood Company, Smith Falls, Ontario.
Fred. Schultz, *The Iron Age*, New York.
C. P. Briggs, Minneapolis S. & M. Company, Minneapolis, Minn.
Thos. M. Roche, Manufacturers' Association, Cleveland, Ohio.
Theo. P. Byram, Byram Company, Incorporated, Detroit, Mich.
H. C. Hoeflinghoff, Bickford Drill & Tool Company, Cincinnati, Ohio.
Dillevar D. Russell, James Russell Boiler Works, Boston.
H. P. Eells, the Bucyrus Company, South Milwaukee, Wis.
S. L. G. Knox, the Bucyrus Company, South Milwaukee, Wis.
Geo. H. Watts, Canadian General Electric Company, Canada Foundry Company, Toronto, Ontario.

Secretary Wuest stated in his report that the association increased over 56 per cent. in membership during the year, and that 25,000 operatives are working in the shops of members. Seventy-four applications were gained during the last four months and a gain of over 5000 operatives was made during that time.

The Commissioner's Report.

E. F. Du Brul, first vice-president and commissioner of the association, read a report which was so heartily applauded by the members as to allow for no doubt as to their appreciation of the thoroughness of the report and the enterprise it bespoke in work accomplished.

It recounted in detail the important doings of the commissioner's office ever since its establishment in

Cincinnati on June 9 last, or shortly after Mr. Du Brul's appointment. It dealt with the inauguration of reforms in systematizing the work, the publication of the *Bulletin* of the association and the issuance of circulars and printed matter which stimulated interest among the members by keeping them thoroughly informed as to the association's work and activity. The report stated that the "Limitation of Output" question was taken up with the members and valuable assistance rendered the United States Department of Labor in securing information on this vital subject. This information will appear in the report of the Department of Labor.

The Eight-Hour bill, Mr. Du Brul said, was taken up in connection with the National Association of Manufacturers, and valuable assistance was rendered by members and the Legislative Committee in securing information and in personal arguments before the Senate Committee on Education and Labor.

The Anti-injunction bill has also received considerable attention in co-operation with the National Association of Manufacturers.

Regarding efforts to secure new members and the local association movement, he said:

"The Council authorized the appointment of a solicitor. Your commissioner secured the services of J. W. Walters, who is now on the road and has turned in a number of applications from good people. The commissioner himself, since August 1, has done a great deal of traveling. Our members in different localities have responded loyally to his calls for assistance; they have arranged meetings with manufacturers in their cities at which your commissioner has appeared and presented the work of this association and its necessity. A number of local metal trades associations were formed or strengthened by these meetings, and a number of employers' associations in different localities have also resulted from this policy. Your commissioner feels, in this regard, that it is well worthy of this association's effort to increase and foster such associations. The local metal trades associations increase the loyalty of the local manufacturers one to the other, even though they are not all members of the National, making it considerably easier for this association to handle labor questions by eliminating the jealousy, suspicion and the lack of unity which so generally prevail among manufacturers. The organization of employers' associations, wherever they exist, is a strong influence on public opinion to hold the agitator and turbulent element strictly within the law, and to see to it that employers receive justice and protection of the law, things which this association gives.

"The association," he said, "has established a certificate system for tried and true workmen, who have been faithful to us during strikes. While the number of these certificate men is not large, it grows with each strike, and we shall soon have quite a body of these men whom we know can be depended on in case of trouble."

The report rehearsed at length the results accomplished at some 35 strikes which affected the shops of members during the last year. After commenting on the difficulties encountered in the strikes and the successful remedies which were applied, and in a few recent cases are now being put into play, it says in part:

"The worst case in our experience shows for how long a time guerrilla warfare can be maintained by the other side. The progress of the strike on the Union Pacific Railroad also demonstrates how effective the union can be in this regard. These strikes can be taken as typical of what we can expect in the future. The Machinists' Union have learned that general strikes are very hard to win. They have also learned that guerrilla warfare can be maintained by them to much better advantage. In some centers such warfare could be stopped by bringing the matter to a head by a lockout, but in other towns there is nobody to lock out.

"There is only one way in which this association can block this guerrilla game, and that is by having at call a sufficient number of tried and true strike breakers to fill the shops immediately. In this regard our efficiency can and will be greatly increased. In one case now in

hand good results are looked for from the counter-organization of the better element."

In connection with

Future Policy

Mr. Du Brul said, among other things:

"We will continue by correspondence and personal visit to get new members into this association, and we shall continue to organize employers' associations and local metal trades associations at every opportunity, and help to make them as effective as possible.

"The education of the employer after being organized must be carefully looked after. The first thing is to get their organization firmly established, the members loyal to each other and able to present a united front to every danger. In the judgment of your commissioner, the principal work of this association for some time to come will be the education of employers along these lines. The organization of employers must be made a great school to dispense information among the people and to afford them the best example of self restraint, fair dealing and public spirit. Unless our organization will make us more wise and more capable of handling the labor question in its broadest aspects, aside from the mere matter of breaking strikes, we had better have none of it. Mere temporary expedients will not suffice.

"A policy must be laid down by this convention for the guidance of the association and its officers which will make for permanent industrial peace, as well as to amply provide sinews for industrial war. If guerrilla warfare is to be maintained, steps must be taken to meet it in the most efficient manner.

"Our financial condition at the present time is most encouraging. Our new members now contribute their proper share of the reserve fund, and all our members, old and new, have been most generous in their financial support.

"This convention will no doubt have great influence on the industrial policy of the metal trades in this country, and on your decision of the various questions that will come up for discussion much will depend as to our continued success and further development in the broadest and best manner.

"In conclusion, your commissioner begs to give testimony of his heartfelt appreciation and to render his personal thanks to each and every member of the association, for their hearty co-operation and response to every call made upon them; also to the officers and members of the Administrative Council for their encouragement and loyal support of the commissioner in his efforts to put this association on the plane where it should rightfully stand and to make the association what it rightfully should be—a great moral and educative influence among the manufacturers of the country, as well as a restraint upon the labor unions."

The report of President S. W. Watkins, who it is expected will be in attendance to-morrow, was read by Vice-President Du Brul. The report stated that, in connection with the proposed basis of national organization, the present plan of making districts more flexible than formerly would work to good advantage, as it allows for better control of the situation, when it is deemed advisable to redistrict a territory, according to conditions as they arise. A committee was appointed to formulate a report, to be submitted to the convention for discussion at to-morrow's session, on "the advisability of agreements with labor unions." This committee is composed of O. B. Kinnard, W. H. Pfahler, James C. Hobart, W. L. Pierce, W. D. Sayle, F. B. Polson and M. H. Barker. This report is expected to canvass the entire situation and offer a subject for interesting debates.

Reports of district chairmen were read, showing the growth and effective work of the association in the various localities throughout the country.

A test of the fluor spar produced by the Kentucky Fluor Spar Mining & Milling Company of Golconda, Ill., was made recently at the foundry of the Jackson Foundry & Machine Company.

Henry K. Wick of Youngstown, Ohio, has returned from an extended trip to California.

Metal Market.

NEW YORK, April 1, 1903.

Pig Tin.—The Banca sale last week of 3000 tons was made at the equivalent of 297½c., c.i.f. New York, or £135, London. It is noted, however, that no deliveries have yet been made, indicating that consumers were not the purchasers. The Metal Exchange statistics show arrivals for the first three months of 10,573 tons, and deliveries of 9400 tons, the stocks on the 28th ult. having been 5295 tons with 5134 tons afloat, a total of 10,429 tons of visible supply, or an increase of 1366 tons during March. The market here is quiet, with some evidences of pressure, and spot closing at 30c. bid and 30.50c. asked. London cables £139 15s. for spot, and £138 15s. for three months. One point in connection with the consumption of Tin must be taken into consideration, and that is that the substitution of tank steamers for shipments of oil in cans is restricting the requirements of Tin Plate and thus also of Tin.

Copper.—The market has been very quiet lately, with consumers well supplied for the near future. On the other hand, sellers claim to have very little Copper for sale for the present and little for delivery during the next two months. March exports are figured by the Metal Exchange at 12,840 gross tons, as compared with 20,012 gross tons during the same period last year. The total exports for the first quarter are 32,254 tons and 49,490 tons, respectively, a decline of 17,236 gross tons. London cables £63 17s. 6d. We quote Lake Copper, 15c. to 15.25c.

Pig Lead.—The market has been quiet. The principal point of interest is the rather sharp decline abroad, which is bringing values there closer to the importation point. It is believed that in the case that importations might become possible the official price would be promptly dropped to cut off the movement. The market is quiet at 4.65c. for 15 days' delivery and 4.67c. for spot. Foreign cables are £12 12s. 6d., a decline of £1 2s. 6d. from the highest.

Spelter.—The advance in the price of Spelter to the present level is attributed to the heavy purchases of leading galvanizing interests, which since the middle of February have purchased upward of 12,000 tons for spot and nearby delivery. It is not believed that the interest in question covered beyond June 1. The market remains at 5.65c. to 5.75c., prompt and spot delivery, New York.

Antimony.—Cookson's is quoted 8.25c. to 8.50c.; Hallett's, 7c., and other brands, 6.75c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—Is unchanged at \$47 per flask of 76½ lbs. each in lots of 50 flasks or more. London cables £8 12s. 6d.

Tin Plate.—There is no change. Business is fair. The price of the American Tin Plate Company is based on \$3.80 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and \$3.99 New York delivery.

New York.

NEW YORK, April 1, 1903.

Pig Iron.—There have been some round sales during the week, including one lot of 10,000 tons at private terms. The event of the week has been the lowering of the official price of the Southern makers to the basis of \$17.50 for No. 2, Birmingham, at which figure, however, outside furnaces had sold prior to that. We quote, at tidewater, for prompt to early delivery: Northern Iron, \$23.50 to \$24; No. 2 Foundry, \$21.75 to \$22.25; No. 2 Plain, \$21.25 to \$21.50; Tennessee and Alabama brands, in New York and vicinity, No. 1 Foundry, \$22 to \$22.50; No. 2 Foundry, \$21.50 to \$22; No. 3 Foundry, \$21 to \$21.25.

Steel Rails.—The demand for small lots continues quite active, but there is little chance for any importations, foreign prices being on the basis of about £5, shipping port, for Heavy Sections. We continue to quote \$28 at Eastern mill, for Standard Sections.

Cast Iron Pipe.—Conditions are unchanged. Small orders are numerous, Eastern foundries getting their books filled still further ahead. No large contracts are reported as either closed or in immediate prospect. Manufacturers continue to quote \$35.50, gross ton, for carload lots of 6 to 12 inch, at tidewater.

Finished Iron and Steel.—The American Bridge Company have closed a very satisfactory month. The orders booked during March aggregated a handsome tonnage. The past week they closed a contract with the Atchison, Topeka & Santa Fe Railroad Company for 3500 tons; with the Pennsylvania Railroad Company for 4000 tons of bridge work and 1000 tons of structural work; with the Missouri Pacific Railroad Company for 2000 tons; with the Pittsburgh, Carnegie & Western Railroad Company for 1000 tons, and for a bridge for China for 1000 tons. The highway business has not yet opened for the season, but it is expected that a good tonnage will develop from this branch of their trade. They are experiencing less difficulty in prosecuting work at points which have been affected by strikes among their workmen. It is confidently believed

that within a very short time all these matters will be adjusted. The demand for Plates is excellent, although recent sales have included few large lots. The consumers of Plates are so well employed that they are obliged to keep themselves supplied with fair stocks. Manufacturers are looking forward with interest to large contracts, which are expected to develop shortly from the several tunnels projected in this vicinity. Prices continue somewhat uneven, depending on the character of the competition from Western mills. We quote, at tidewater, as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates are 1.85c. to 2c. for Tank, 1.95c. for Flange, 2.05c. for Marine and 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.75c. to 1.90c.

Old Material.—The demand is good from all classes of consumers. The large mills are disposed to be bearish, endeavoring to force prices down, but dealers are stated to be bidding over them for material from the railroads, as they have great faith in the future. It is confidently expected by the dealers that the mills will shortly change their policy and buy for future requirements, instead of from hand to mouth, as at present. Steel Melting stock is a little higher, owing to the strong demand from the Steel works. Old Iron Rails are very scarce, leading consumers stating that they have never seen the market so bare of this class of material. Old Car Wheels are less sought for, but the supply in sight is so small that they are strongly held. We quote, f.o.b. cars, vicinity New York, per gross ton, as follows:

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, long lengths.....	21.50 to 21.75
Old Steel Rails, short pieces.....	19.25 to 19.50
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	31.50 to 32.00
Old Car Wheels.....	24.00 to 25.00
Old Iron Axles.....	30.50 to 31.00
Old Steel Car Axles.....	25.50 to 26.50
Heavy Melting Steel Scrap.....	19.25 to 19.50
No. 1 Railroad Wrought Scrap Iron.....	22.50 to 23.50
Iron Track Scrap.....	19.50 to 20.50
Wrought Pipe.....	15.50 to 16.50
Ordinary Light Iron.....	11.00 to 12.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	14.00 to 15.00
Wrought Turnings, delivered at mill.....	17.00 to 18.00
Cast Borings, delivered at mill.....	11.00 to 12.00

"Egyptianized" Clay.

Egyptianized clay is the name given by E. G. Acheson to a product which results from his patented process for the treatment of clays. In laboring in the crucible field Mr. Acheson made the discovery that clays from Germany were more desirable for some work than those in this country, even though they possessed the same chemical combination. It was found they were not so strong. Mr. Acheson set out to ascertain the reason, with the result that he has discovered and patented a process for the treatment of clays. Tannin is the agent used. Tests made by Mr. Acheson and experts of eminent ability and national reputation go to show that so little as ½ of 1 per cent. of tannin develops wonderful results. However, the maximum effect appears to be obtained by the use of 2 per cent. of tannin and a ten-day treatment. Tests demonstrate that Mr. Acheson's treatment of clay increases the tensile strength 50 per cent. in the burned form and 350 per cent. in the sun dried form. Tests in several clays prove this. Where ½ of 1 per cent. of tannin was used, it was found that it required 13 per cent. less water to make the clay soft. The treatment keeps the clay of natural color, which is an important factor. Many clays are not plastic, but Mr. Acheson's treatment will make them so, while it is also a fact that numerous clays have a crackling tendency, and this is removed by the Acheson treatment. If a sun dried clay can be made stronger than a burned article, it is plain that coal bills may be reduced by the process and great economy effected thereby. By the Acheson method and treatment articles in clay may be made of exact size, because there is less shrinkage and warpage.

The Carnegie Steel Company, the National Steel Company and the American Steel Hoop Company, which have practically been under the management of W. E. Corey for a considerable time past, have been formally merged under the title of the Carnegie Steel Company. The officers of the company are as follows: W. E. Corey, president; H. P. Bope, first vice-president and general manager of sales; W. W. Blackburn, second vice-president and secretary; W. C. McCausland, treasurer; W. R. Conrad, assistant treasurer, and Jas. J. Campbell, auditor and assistant secretary.

Iron and Industrial Stocks.

The stock market during the past week has been subjected to varying influences. Decided weakness was displayed in the prices of most stocks for a considerable part of the week, because of the scarcity of money due to the accumulation of funds for the payment of April interest and dividends. Call money was bid up at one time to 12 per cent. A partial recovery occurred on Tuesday of this week, which was assisted by expressions of great confidence in the soundness of general business conditions by J. P. Morgan. The improvement was also assisted by a belief that the period of financial stringency was about ended. Among the changes of the week may be noted the decline of American Can preferred from 45 to 42 $\frac{3}{4}$; Central Foundry preferred from 16 to 15; Colorado Fuel & Iron from 66 $\frac{1}{2}$ to 63 $\frac{1}{4}$; Crucible Steel common from 19 $\frac{1}{4}$ to 18 $\frac{1}{4}$; Otis Elevator common from 45 $\frac{1}{2}$ to 41; Otis Elevator preferred from 96 $\frac{1}{2}$ to 90; Republic common from 20 to 19; Republic preferred from 78 to 76 $\frac{1}{4}$; Sloss-Sheffield common from 62 to 53; Tennessee Coal & Iron from 66 $\frac{1}{2}$ to 63 $\frac{1}{2}$; United States Steel common from 36 $\frac{3}{4}$ to 35 $\frac{1}{4}$; United States Steel preferred from 86 $\frac{1}{2}$ to 84 $\frac{1}{2}$. At Montreal, Dominion Iron & Steel declined to 25, making a new low record. All these stocks have gained some portion of their losses under the more cheerful conditions ruling on Tuesday. A notable advance was made during the week on Empire common, which sold from 10 up to 14, while the preferred advanced from 40 to 44. The United States Steel Corporation's new 5 per cent. bonds sold down to 85 during the week, making a new low record, but recovered somewhat with the rest of the market. On Wednesday the stock market was adversely affected by the announcement that the Wabash Railroad injunction proceedings at St. Louis had been decided against the railroad, thus leaving the way open for the national officials of labor organizations to call out their members now employed on that system.

The American Locomotive Company.—A statement issued after a meeting of the Board of Directors of the American Locomotive Company on March 26 reflects the wonderful prosperity of the locomotive building companies as well as the railroad systems of the country. The earnings of the company for the nine months ended March 31 were equivalent to nearly 50 per cent. on the outstanding capital stock. The following is the statement given out by President S. R. Callaway:

The earnings for the nine months ending March 31, 1903 (the month of March being partly estimated), were \$23,956,345, an increase of \$4,859,607 over the same period of last year. Since the organization of the company in June, 1901, more than \$3,000,000 has been expended in the erection of new buildings and the purchase of new tools and equipment. The output shows an increase of 35 per cent. since the organization of the company, and the work of still further enlarging the capacity of the plants, by the purchase of property, new tools and equipment, is steadily maintained. Although badly handicapped by delays in receiving material, deliveries are being made substantially on time, and in many instances the dates promised for shipment have been anticipated. Within the last two months orders have been received for over 600 locomotives. All of the eight plants of the company, employing more than 16,000 men, are running night and day.

The satisfactory showing of the company served to revive the report that dividends on the common stock were a question of the immediate future. However, it can be said that the policy of the company for some time to come will be to devote earnings to extensive improvements, and build up their working capital. To carry on their business a large working capital is necessary.

The sum of \$200,000 of 6 per cent. cumulative preferred stock of the Brown-Ketcham Iron Works of Indianapolis was offered to the public for six hours March 26, and was oversubscribed to the amount of \$27,200. It was offered at 106, or \$53 per \$50 share. The new capital showing is: Common stock, \$200,000; preferred stock, \$350,000; surplus, \$300,000; undivided profits, \$45,067.20. The average annual net profit of the company for the last four years is given as \$129,180.90, over six times the dividend on the preferred stock. The company's plant at Haughville, now a part of Indianapolis, has been in operation 22 years, and the plant at Huff's Station, near Greensburg, Pa., was completed late last year. The present officers, Wm. H. Brown, president; John L. Ketcham, secretary-treasurer, and Wm. R. Brown, superintendent, have been in charge of the business 15 years.

The Westinghouse Machine Company of Pittsburgh have issued a circular letter to stockholders stating that profits for the nine months ending December 31, 1902, were \$673,622.24, against profits for the year ending March 31, 1902, of \$833,254.02. Of the action of the stockholders at a meeting held last year, when it was voted to increase the capitalization of the company from \$3,000,000 to \$5,000,000 to care for increased business, it is stated that blanks on which stockholders can make their subscriptions for new stock are now ready. The stock is to go out at \$100 a share, par value \$50, and each stockholder of record on March 25, when the books will be closed, has until April 25 to subscribe for the new stock. Each stockholder is allowed to subscribe for two-

thirds of his present holdings, and payment for the new stock must be made before April 25.

The net earnings of the Westinghouse Air Brake Company of Pittsburgh for each year since 1896 have been as follows: 1896, \$2,607,936; 1897, \$1,820,527; 1898, \$3,967,973; 1899, \$3,642,241; 1900, \$3,519,198; 1901, \$2,981,341; 1902, \$2,928,697. The surplus reported July 31, 1902, was \$3,237,044.

Dividends.—American Locomotive Company have declared a quarterly dividend of 1 $\frac{1}{4}$ per cent. on the preferred stock, payable April 21. Books close April 3, and reopen April 21.

Vulcan Detinning Company have declared a quarterly dividend of 1 $\frac{1}{4}$ per cent. on the preferred stock and 1 per cent. on the common stock, payable April 20. Books close April 9, and reopen April 21.

The Allegheny Heating Company, Allegheny, Pa., suppliers of natural gas, have declared an extra dividend of 4 per cent., payable March 30. The company pay regular quarterly dividends of 3 per cent., but several extra dividends have been the custom each year. Last year a 5 per cent. extra dividend was declared in February and a 2 per cent. extra in August. The capital stock is \$500,000, the Philadelphia company of Pittsburgh, the majority owner.

The Pittsburgh Plate Glass Company of Pittsburgh have declared the regular quarterly dividend of 1 $\frac{1}{2}$ per cent. on the common stock, and the annual dividend of 12 per cent. on the preferred, payable April 1.

The Pennsylvania Light, Heat & Power Company have declared a quarterly dividend of 1 $\frac{1}{2}$ per cent.

The American Institute of Electrical Engineers have arranged to extend certain privileges to those who are regularly pursuing studies in electrical engineering, and who will be designated as students of the American Institute of Electrical Engineers. These consist of the privilege of being present at all meetings of the institute, except such business meetings as relate to the management of the institute, receiving the regular announcements and printed copies of monthly transactions, and purchasing the semiannual bound volumes of the transactions of the institute. They have also arranged for the establishment of local or branch meetings in connection with universities and technical schools, at which the papers presented at the New York meetings are presented in full or in abstract under the direction of a professor of electrical engineering, an electrical society or other organization conducted by the students themselves.

The Pressed Steel Car Company have removed their offices from the Tradesmen's Building to the Farmers' Bank Building, Fifth avenue and Wood street, Pittsburgh, where they have secured more commodious quarters to take care of their greatly increased business. This company have possession of the entire nineteenth floor and have spared neither money, time nor effort to make their offices the finest and best appointed in Pittsburgh. New desks, carpets, furniture, typewriters and all other furnishings requisite to make the offices bright and cheerful have been purchased. All of the new furniture is finished in mahogany. A special invitation is extended to the friends of the Pressed Steel Car Company to visit these offices and pass judgment upon their superior qualities and elegance.

Demands for a new wage scale, to take effect May 1, are being received by contractors and erectors of structural work from the local branches in different cities of the International Bridge and Structural Iron Workers' Union. Most of the unions ask 50 cents an hour. In New York the union wants 56 $\frac{1}{4}$ cents an hour.

The William Tod Company, Youngstown, Ohio, have received an order from the National Steel Company for two pairs of cross compound vertical blowing engines, with 54-inch high pressure, 102-inch low pressure steam, 108-inch air cylinders and 60-inch stroke. These engines will be used in connection with the new blast furnace, No. 4, to be built by the National Steel Company at the Ohio Works, at Youngstown.

The annual meeting of the International Protective Association of Tin Workers will be held at Anderson, Ind., April 29.

Chicago Machinery Market.

CHICAGO, March 28, 1903.

Advices from manufacturers of machinery in the Northwest indicate that the month of March has brought no diminution in the volume of business; in fact, in nearly all departments an increase has been experienced compared with preceding months of this year and with the corresponding month a year ago. Nearly all manufacturers also report some improvement in the assembling of raw material, although considerable inconvenience, if not financial loss, still results from delays of this character. The car situation also is said to have improved during the past few weeks, but it is by no means normal.

The increased cost of production resulting from higher prices for raw material, increased wages and advance in freight rates is naturally being reflected more or less in the prices of the manufactured product. Manufacturers differ considerably as to how much of an advance the manufactured product has already sustained, some claiming a proportionate increase, while others think it is below the level justified by the higher prices of raw material. Thus far, apparently, consumers have not been deterred from placing orders not only for quick shipments, but for several months to come. There can be little doubt, however, and this seems to be the general sentiment, that should prices of machinery be further advanced consumption would be materially curtailed. As to the immediate future the outlook could scarcely be brighter, with the single exception of labor troubles which are cropping out.

As the rule, manufacturers possess orders which will keep the plants busy at their increased capacity for from two to six months, and in exceptional instances of special machinery and engines, even one year from date. The reports which follow in detail are of unusual interest and nearly all of them bear upon the same points, reflecting the general sentiment among the trade. A few manufacturers and dealers continue to report a fair trade, but the great majority are less and less interested in foreign shipments and with the continued advance in prices seem to think that the prospect for foreign trade at least in the immediate future is not encouraging. There are notable exceptions, however, in special lines.

Machine Tools.

Williams, White & Co., Moline, Ill., say that business is still good, but they find that higher prices have affected the amount of business. Inquiries have fallen off considerably in the last month or two, more particularly in foreign trade, high prices having a more prohibitive effect on export business.

The New Doty Mfg. Company, Janesville, Wis., say that the condition of business continues as good as it has been at any time in the past with indications of good business for months to come. In their line of tools the increased cost of manufacturing resulting from higher raw material and higher wages has not been followed by an increase in the selling price of the machines, or if there has been any increase it has been very slight, but they think this increase will have to come unless there is a change in the present situation with regard to material and labor.

The Aurora Tool Works, Aurora, Ind., say that their March business exceeded that of March, 1902. They are experiencing more trouble in getting their goods delivered at destination than in getting cars to ship them. The increase in cost of material, advance in wages and expense of production are out of all proportion to the advance they can get for their output. They have received some foreign orders, but not to any great extent.

The Geo. Whiting Company, Chicago, report business for the month of March about equal to the average of previous months, but with a considerable increase in the number of inquiries for new machines. They have recently found it necessary to increase their wage scale, and while they will endeavor to embody this additional expense in the prices of the machines, they do not feel that the present market reflects this increase. Among a few of the orders they have recently received are the following: M. Westover & Co., Lincoln, Neb., 18-inch punch; Jennet Bridge & Iron Works, Chicago, 42-inch punch; H. W. Caldwell & Sons Company, Chicago, 12-inch punch; John Mohr & Sons, Chicago, combined belt power riveter and punch with stake 49½ inches long; McDowell, Stocker & Co., Chicago, 42-inch punch, 18-inch throat punch, with structural jaw and a capacity to punch 1-inch hole in 1-inch plate, and 12-inch throat punch.

Hill, Clarke & Co., Chicago, say that they have had an excellent run of business during March, and think that the month will be fully equal to, if not better than, the corre-

sponding month a year ago. Orders are not especially large, but there seems to be a general run of business from various sources. They notice special activity in the line of gas engines and automobile work.

Engines, Boilers and Pumps.

The American Steam Pump Company, Battle Creek, Mich., experienced a very good business during the month of March, and from present indications it will exceed last March by at least 10 per cent. Their foreign trade has kept up and shows indication of increase.

The Otto Gas Engine Works, Chicago, say that sales during the month of March are in excess of those of the corresponding month last year and every indication is for an increase in trade for this year. The only cloud on the horizon so far is a possibility of labor troubles; general indications are for stationary prices for labor and material outside of Chicago. Inquiries for railroad work for this season are coming in heavier than usual.

The Strang Engine Company, Chicago, say they are having inquiries from all over the country and Canada, showing a widespread interest in kerosene engines. They believe that as manufacturing costs are constantly increasing, increased prices must result in consequence, although the effect will be eventually to curtail business and hold back improvements.

The Weber Gas & Gasoline Engine Company, Kansas City, Mo., state that business with them so far this year shows a substantial increase over corresponding months of last year. In regard to the increased cost of production, the company state that the manufacturers in their line have not as yet increased selling prices proportionately. Their export trade continues good.

The Nordberg Mfg. Company, Milwaukee, Wis., say that the conditions in the machinery business are generally the same as for some time past, except that inquiries are more frequent, noticeably from the copper and iron regions. They are not yet in position to accept any large orders, unless long time for shipment is given.

Tools and Supplies.

The Armstrong Bros. Tool Company, Chicago, say that March has been a very heavy month with them, comparing favorably with March, 1902, which was one of the biggest months in their experience. The principal feature of the month's business has been the heavy orders received from dealers handling their goods, showing a general feeling of confidence in the future demand for goods of this character and possibly also indicating that dealers are prepared for an advance in prices and are acting accordingly. They believe that the advance in the cost of raw material and labor will force such an advance in prices in the near future.

The Fuller & Johnson Mfg. Company, Madison, Wis., say that the demand for the product of their factory is about the same as a year ago at this time. The increased cost of manufacture, resulting from higher raw material, increased wages to labor and higher freight rates has not been fully made up by increased selling prices of the manufactured goods. A further advance must be made to insure reasonable margins of profit, but they are inclined to think that higher prices would have a tendency to curtail business.

The Whiting Foundry Equipment Company, Harvey, Ill., state that their orders for machinery during March have been considerably in excess of a year ago. Barring unforeseen calamities or unusual labor troubles, they consider the prospects for business during 1903 most flattering. Higher prices of raw material, increased wages and higher freight rates reflect on the selling price of manufactured goods, but much higher prices would undoubtedly curtail business. They have recently received large orders from the following concerns: Canadian Locomotive Company, Canadian Pacific Railway, Illinois Steel Company, South Works, Murray Iron Works, Vermont Marble Company, Westinghouse Electric & Mfg. Company, Great Northern Railway Company, Union Street Railway Company, Otis Elevator Company and West Virginia Plate Glass Company.

The Gardner Governor Company, Quincy, Ill., report a magnificent business during March, the largest in their history. The governor trade has been particularly good, total shipments aggregating 1600 governors. As each governor is intended for a throttling engine, this showing indicates that the engine builders must be also enjoying prosperous times. A few years ago it was said that the throttling engine business was on the decline, but the record of governor sales during the past year and especially the past month certainly disproves that conclusion and clearly demonstrates that the sphere of usefulness of the throttling engine instead of growing less is, on the contrary, expanding. The increased cost of production necessitates advances, and while the company anticipated that higher prices would curtail business, there seems to be no slackening as yet. They report that foreign trade looks brighter, there being many orders booked for foreign shipment.

The Chicago Pneumatic Tool Company, Chicago, say that business in their line has never been better. The preceding months in the current year have been exceedingly prosperous for the pneumatic tool trade; in fact, so much

so as to mark an epoch in the history of that industry. They received for the first half of March, 1903, more orders than were received during the entire month of March, 1902, and should the present activity cease, which is altogether improbable, the facilities of the company's factories would still be taxed to the utmost to fulfill requirements. The foreign trade outlook is correspondingly cheerful, their foreign offices reporting numerous and large sales from every portion of the civilized world, certain and sure evidence that pneumatic machinery is fast becoming invaluable everywhere.

The Ransom Mfg. Company, Oshkosh, Wis., state that their business during each of the months of February and March of this year was 50 per cent. larger than any month they ever had before. They have plenty of orders on the books to keep them running for some time. The high price of material in this country has interfered to some extent with their foreign trade, but domestic business has been so great as to make up for this loss. The principal demand seems to be for large grinders, and distributed among a variety of buyers.

Power Transmission Machinery.

The Link-Belt Machinery Company, Chicago, report that business for the month of March was about the same as for the two preceding months of this year, but considerably in excess of the corresponding month of last year, this not being owing to their taking any unusual contract, but rather to a steady increase in business. The prospects are extremely favorable for a continuation of business for an indefinite time; they never in their history had so many inquiries as at present. While they have not as yet been obliged to advance the cost of their products, there is no doubt that a still further advance in material and labor will necessitate a slight advance, but this they believe will not affect their business.

The Aetna Foundry & Machine Company, Springfield, Ill., say that business with them for the month of March has been very active and compared favorably with the preceding month of this year and the corresponding month of a year ago. The outlook, as indicated by orders already booked, insures activity for several months, until July 1 at least, and without doubt even further. They have sold hoisting engines in the last 30 days to the Sangamon Coal Company, Springfield, Ill., and the Clark Coal & Coke Company, Peoria, Ill., and have a number of prospects in the Springfield Co-operative Coal Company, Tuxhorn Coal Company, Indianapolis, Decatur & Western Railway Company, Springfield, Ill.; Republic Iron & Steel Company, Chicago; Maplewood Coal Company, Peoria, Ill.; McAlester Coal & Mineral Company, Wilburton, I. T.; Century Coal Company, Tower Hill, Ill.; Northern Coal & Coke Company, Denver, Colo.; Whitehall Sewer Pipe Company, Whitehall, Ill.; Manufacturers & Consumers Coal Company, Decatur, Ill., and the Devlin Coal Company, Toluca, Ill., all of which the company believe will place orders between now and July 1. The continued purchasing of coal rights in Illinois seems to indicate that the coal of that section is to become more valuable.

The Northern Engineering Works, Detroit, Mich., say that they have found the volume of business during March better than last year, and in some respects better than the preceding months of this year. They have more work ahead than they had at this time last year. The improvements to their structural shop have been completed, materially increasing the capacity and enabling them to make better deliveries than hitherto.

Probably the most important item the Reeves Pulley Company of Columbus, Ind., have to report with reference to the general trade conditions for the month is that labor agitation still exists. The labor leaders are threatening to center their fire on Columbus and make a concerted effort to unionize the town. This has brought to an absolute standstill all building enterprise and has had the effect of a general stagnation of business. The Reeves Pulley Company report that they had contemplated the formation of a foundry company and beginning work immediately, but in a meeting of the Board of Directors, convened on the 28th ult., it was determined to indefinitely postpone this enterprise. One of the large furniture factories at Columbus is completely closed, and the manufacturers are all of them distrustful of what the future may bring, and in anticipation are simply curtailing every progressive move. The Reeves Pulley Company add in a letter to us: Certainly if the aim of unionism is to thwart commercial activity, shut down factories, throw laborers out of employment and create a spirit of distrustfulness and dissatisfaction among the manufacturers and trades people they are succeeding admirably in Columbus, Ind.

Stephens-Adamson Mfg. Company, Aurora, Ill., say that they have a much larger amount of work booked than they had a year ago. They have recently taken a contract for furnishing the complete equipment for a large cement plant being erected near Easton, Pa., the equipment for which will amount to some 15 or 16 carloads of machinery, including belt conveyors, elevators, transmission machinery, &c. They are enjoying a fair amount of regular trade, but current orders are not very much larger than they were a year ago.

A large amount of work is in sight, which, together with what they have on hand, will keep them busy for several months.

Special Machinery.

Barnard & Leas, Moline, Ill., report that as their line of business is the building of flouring mills and grain elevators, the winter months are their dull season, but they have noted quite an increase in orders during the past 20 days and are inclined to think, from indications, that the ensuing year will be quite active. They have received a number of contracts from mills in the Southwest and South during the past 30 days.

The Holthoff Machinery Company, Cudahy, Wis., say that the condition of their business for the month of March has been very satisfactory, more so than they expected. The outlook for foreign trade is also good. During the present month they have taken contracts with the Pike's Peak Hydro-Electric Company for a large pipe line for Colorado Springs; Portland Gold Mining Company for miscellaneous machinery; Wisconsin-Mexico Mining Company for a stamp and concentrating mill and for a smelter, as well as for quite an extensive pipe line to be erected in Utah.

The D. Clint Prescott Company, Menominee, Mich., state that general business in their line for the month of March shows the same proportion of increase as several months past, and they are very much pleased with the outlook for the future. Their home trade is so large at the present time that they are not paying much attention to foreign trade.

The American Machinery Company, Grand Rapids, Mich., state that their sales for the month of March have been considerably larger than for the corresponding month last year, and are about the same as the preceding months of the present year. They have less complaint as to the shipment of manufactured goods, although they still have a great many delays reported. Orders already booked indicate that they will be very busy for several months at least. The increased cost of manufacture has had no proportionate effect on selling prices, but if present conditions continue, or a further advance in cost takes place, they must necessarily advance prices. The outlook for foreign trade in their line is not especially bright at the present time, although they are making fairly good shipments to Great Britain.

The Stover Mfg. Company, Freeport, Ill., say that so far this year there has not been as strong a demand for their line of implements as there was a year ago. Up to the present time, however, their factory has been quite busy and is still well occupied with orders. The volume of spring trade will depend largely upon the season; if the rain fall is normal or should the spring be dry, there promises to be a good demand. Their foreign trade is constantly on the increase and they are receiving very satisfactory orders from various foreign countries for their line of wind mills. Shipments up to this time are considerably in excess of the same period one year ago, but do not have as many orders on books for future delivery. The continued high prices of materials and the increased rate of wages make the cost too high for a very liberal sale of goods. They have been obliged to advance prices somewhat, owing to the increased cost, so that the trade is now complaining, and the company do not think it will stand a further advance without materially lessening the volume of business.

The Green Engineering Company, Chicago, say that as a whole the stoker business this year is more promising than ever before. At the same time they find the usual condition in this line—viz., the first three months are very much prospective and contracts do not begin to close up definitely until after March 15. They find decided improvement in the assembling of raw material, which is quite in contrast with conditions at the same season last year. But transportation facilities at present are worse than ever. They find it takes three or four weeks to ship material from Chicago to Eastern, Southern, or even Western points, to which they have at other times shipped regularly in from five to ten days. This condition of transportation is almost exasperating and seriously interferes with their business. The company believe that further increase in prices will curtail business. Among contracts which they have taken during the past 30 days are the following: 3000 horse-power with the Omaha & Council Bluffs Street Railway Company; 2000 horse-power, with the Chicago, Rock Island & Pacific Railway Company, for the East Moline (Ill.) shops; 1000 horse-power, with the Danville Street Railway & Light Company; 1000 horse-power, with the Pennsylvania Railroad Company.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., state that business still remains good and prospects are bright for future trade.

The Vilter Mfg. Company, Milwaukee, Wis., say they are exceedingly well pleased with the amount of business secured, which is somewhat in excess of February business. They are now booking orders for delivery in July and later. They have secured some foreign business, but do not consider the outlook for foreign trade promising until the prices of raw material are considerably reduced. With

present high prices they cannot compete with foreign manufacturers.

The Webster Mfg. Company, Chicago, say that business with them is exceedingly good. The volume of business is larger than it was last year, and they have orders booked to carry them well into the summer. They are so busy with domestic trade that they are not doing or soliciting any foreign business.

Philadelphia Machinery Market.

PHILADELPHIA, March 30, 1903.

Conditions generally have been increasingly favorable during the past month in the Philadelphia machinery market, and while business was good during February, there was an undercurrent of uneasiness which has now entirely disappeared. This feeling was no doubt caused by the anticipation of a report by the Anthracite Strike Commission which might in a measure interfere with the confidence in continued prosperity. This has been dispelled by the findings of the Commission, which appear to have met with general favor in the trade. With the amount of business now in hand and the volume of inquiries and new business coming in, a continuation of the present prosperous conditions in the various branches of the machinery trade seems assured for a long time. The daily influx of new business during the past month is noticeable in all branches of the trade, and in many plants the estimating departments are being taxed to their utmost to meet the demands of prospective customers. Some very nice contracts have been closed by both manufacturers and dealers in machinery and tools, while a number of other good specifications are still in abeyance. The labor question deters some from immediate placement of orders, and it is the consensus of opinion that it is only from this source that any interference with the present conditions might be anticipated. Not that manufacturers themselves might experience any trouble with their help, but that injury might be indirectly occasioned by delays incident to the delivery of material necessary for the completement of orders in hand.

The manufacturers of the heavier engines, special tools and heavy machinery continue the most active, and have orders booked to keep their various plants running for a number of months. Orders continue to be taken for next year's delivery, and in a number of cases it would be practically impossible for builders of large special tools or engines to promise delivery inside of six months. Three or four months might be considered excellent delivery in many cases. Deliveries of raw material have improved, particularly as regards bituminous coal, although desirable brands of pig iron are still scarce, the various furnaces having contracted for their capacities for the first half of the year, and in many cases for more extended dates. Coke continues the most scarce, and prompt delivery of good supplies of foundry coke is almost as hard to get as it was a month ago.

Foreign demand shows an improvement in some lines. New business for delivery in Canada, Great Britain and the Continent is to be noted, while the demand for pneumatic machinery continues large. Manufacturers transacting business in established lines abroad report some increases in orders, but the general resumption of foreign trade appears just as far off as ever.

There has been some improvement in the demand for the medium standard machine tools, while dealers' floors continue well filled, sales are more numerous, and as manufacturers of these lines can make prompt deliveries, gaps are as quickly filled as they are made. This trade has been generally considered as very satisfactory for the month of March.

There is scarcely any improvement noticeable in deliveries of gray iron castings, while deliveries of steel castings have if anything become more extended. With the increase of the general machinery business comes increased demand for castings and with foundries taxed to their utmost better deliveries are hard to get.

The field for steel castings seems to become larger and larger, and several new and enlarged plants are now in contemplation. The Brylgon Steel Castings Company of Reading, Pa., will remove to New Castle, Delaware, where a large tract of land has been acquired and an extensive plant is to be erected. Chester, Pa., is to have a new steel casting plant, in which local parties are said to be interested, and a

new foundry and machine shop is to be built in Camden, N. J.

There is a strong demand for the lighter machine tools, boilers, engines, &c., and an improvement is to be noted in the past month's business. Deliveries on standard types of the foregoing lines are somewhat easier. Active requirements are to be noted in machine shop supplies, with but little change in deliveries, although manufacturers of some lines are considerably behind on orders.

There is no particular change in prices, quotations continue firm, and in some lines without special competition they have stiffened. In some cases premiums are offered for prompt deliveries, but in many instances manufacturers are unable from press of work to make deliveries wanted.

Frank W. Henry, mechanical engineer, who for a number of years has been engaged in designing machinery and machine tools, and lately in charge of the designing and mechanical department of the late Franklin Machine Works, Incorporated, has opened an office at 205 Odd Fellows' Temple, in this city, where he will conduct the business of designing and improving machinery and machine tools and mechanical drawing in all its branches.

H. A. Rutherford and F. P. Spiese will under the name of the H. A. Rutherford Company establish a plant at 2923 North Broad street, in this city, for the manufacture of various lines of pneumatic tools under patents of Mr. Spiese. Rotary engines, hoists and special machinery will also be manufactured.

Edwin Harrington & Son Company, Incorporated, are having plans prepared for a four-story manufacturing plant to be erected on property recently purchased by them at Sixteenth and Callowhill streets. Part of this property has been used by them for some time for the manufacture of hoisting machinery. The property acquired measures 100 x 395 feet 8 inches.

H. B. Underwood & Co. advise us that the demand for their special tools for railway shop work as well as for general machine work has been very large, and all departments of their plant continue busy. Some recent deliveries include a large portable valve seat rotary planing machine for one of the large railway companies, while portable cylinder boring bars have been shipped to various shops of the Pennsylvania Railroad Company. Several cylinder dome facing machines have also been shipped to a number of railroad shops, while a number are in course of construction.

The Espen Lucas Machine Works have shipped a number of their new cold saw cutting off machines during the past month, and the demand for these tools continues extensive. Some very good business in their line of Franklin machine tools has been taken with considerably more in sight. Three 18-inch I-beam cutting off machines are to be included among those recently delivered. Their plant is now being operated overtime in order to meet the demand for these tools.

The Southwark Foundry & Machine Company report a very excellent condition of trade. The demand for heavy machinery is large, and all departments are being operated to their very best capacity. A number of large Weiss condensers are in course of construction for various parties, and a number of shipments of them have been recently made.

The Falkenau-Sinclair Company have booked a number of orders for various standard presses during the past month, and inquiries have been more numerous than at any previous time. Several orders for large tools have been taken for Canadian and for Pacific Coast delivery, and all departments of their plant are being operated to their full capacity. Recent deliveries include a 10,000-pound chain testing machine for Ohio parties. A new automatic cement testing machine has been delivered to a West Virginia company, and an order for a similar one has been taken for shipment to Cuba. A number of standard presses, including one No. 6, a geared No. 3, a No. 4, and several each of Nos. 1 and 3 standard presses have been shipped to New York, Ohio and Pennsylvania customers and to parties in Seattle, Wash.

The Philadelphia Roll & Machine Company continue very busy. Inquiries are numerous, and the estimating department is crowded with work. Many orders for charcoal iron castings have been taken, and activity for a long time is assured. A number of rolls, both sand and chilled, have recently been shipped to the various large steel and iron mills, and deliveries of mill machinery and special castings have also been made.

The Philadelphia Pneumatic Tool Company have secured a contract from the Lake Shore & Michigan Southern Railway Company to supply them with all the pneumatic hammers which they will use in the new Collingwood shops and on the entire system for a period of one year. This contract, they say, is awarded after a competitive test of all the different makes of pneumatic tools. This company have also received large orders for chipping and riveting hammers and drills from the Wabash, the Delaware, the Delaware & Hudson and the Central of New Jersey railroads. All departments of this plant continue to be operated to their

full capacity, and conditions for future trade are considered entirely satisfactory.

The American Pulley Company's business continues to grow, both in foreign and domestic territory. Extensive deliveries for foreign account have been made during the past month, including among others 130 pulleys, all of one size, for Manchester, England; 625 pulleys of various sizes to Copenhagen, Denmark, and 250 to Auckland, New Zealand, while other exportations have been made to Geneva, Switzerland, and other places on the Continent. The local demand continues good while carload shipments are the order for Southern, Western and Pacific Coast points. These parties also report an extensive business in special shapes, particularly in pressed steel automobile hubs, which are being made in large quantities.

The Link-Belt Engineering Company have had a large increase in inquiries for all their lines during the past month, and the estimating department has been taxed in order to meet the demand. Some very nice orders have been booked, particularly for Renold silent chain drives for various purposes. Deliveries during the month include a large quantity of transmission and elevating machinery for different purposes and conditions are favorable for a continued good volume of business.

The Alfred Box Company, manufacturers of electric and hand power traveling cranes, &c., continue busy. Inquiries and resultant orders have been satisfactory during the past month, and include among others orders for two 3-ton three-motor electric traveling cranes for the General Electric Company's Lynn (Mass.) shops, and one for a 25-ton four-motor electric traveling crane for Henry A. Hitner's Sons, Philadelphia, Pa. Estimates for the addition to the Box Company's plant (previously reported) are now being taken, and it is hoped that operations can be started on it at an early date. Among recent deliveries of cranes may be mentioned: A 5-ton three-motor electric traveling crane for the Dunkirk (N. Y.) shops of the American Locomotive Works; a 5-ton electric hoist jib crane for the League Island Navy Yard, United States Government; two 15-ton hand-power traveling cranes for the Union Railway Company, New York City; two 5-ton three-motor traveling cranes for the United States Steel Company, West Everett, Mass.; two 5-ton three-motor electric traveling cranes for the Otis Elevator Company, Yonkers, N. Y., and four 5-ton electric hoist portable jib cranes for the Snow plant of the International Steam Pump Company, Buffalo, N. Y.

The Tabor Mfg. Company report a satisfactory business during the past month, and orders for a number of molding machines have been taken. Foreign demand has been good, and a representative of the company, who has recently returned from a trip to England, advises us that conditions are favorable there for an increasing business during the present year. English foundrymen are considering the molding machine problem more carefully, and the Tabor Company expect to double last year's business in that country during 1903. This company during March made a shipment of molding machines which has been looked upon in the trade as being rather phenomenal. An order was received for a number of standard power running vibrator frame molding machines. Shipment was made the same day by express to a point some 200 miles from this city, and the machines were received, set up and in operation three days from the date of shipment. A number of other deliveries of a more normal character have also been made, many of which were duplication orders.

The Eynon-Evans Mfg. Company are actively engaged in making the improvements previously noted in these columns. Permits have been taken to begin operation on the additions to their power house and office buildings; and other improvements, including the equipment of motor drives to all their machinery, are under way. A good demand for steam jet blowers is to be noted, and deliveries have been made to a number of the large steel plants, including one lot of 40 for a New England concern. An increased demand has developed for acid resisting bronze castings for mine purposes, and the foundry has a number of orders for this class of work. A number of large patterns in course of construction for the New York Ship Building Company, Bethlehem Steel Company, American Bridge Company, and other large concerns are keeping their pattern department very busy at the time.

The Energy Elevator Company have had a very satisfactory month. This company recently extended their line to passenger elevators, and have booked among others an order for a direct connected electric passenger elevator for Atlantic City (N. J.) parties. A special book lift has been installed by them for the Hampton Library, Hampton, Va., while a trunk lift, the fifth of its kind, has been installed for Ocean City (N. J.) parties. An order has recently been booked for the four freight elevators to be placed in the new Rockefeller Hall, at Bryn Mawr College, Bryn Mawr, Pa. Elevators have also been shipped to parties in Ithaca, N. Y.; Lancaster, Pa.; Prescott, Ariz.; Flushing, Ohio; Bessemer, Ala., and Franklin, Va., and a large number have been installed for local parties.

The Wm. Cramp's Ship & Engine Building Company are

operating all departments of their plant at its best capacity. Many vessels are in varying stages of completion, and the keel plates of others are awaiting space for placing. This company launched on the 28th ult. the passenger steamer "Asbury Park" for the Central Railroad of New Jersey, intended for service between New York, Sandy Hook and Northern New Jersey coast resorts. The vessel measures 306 feet over all, 51 feet 4 inches beam, and her draft is 11 feet. She will be equipped with triple expansion engines and driven by twin screws. Her contract speed calls for 20 knots per hour. She will be fitted in hard wood throughout, and will have a carrying capacity of 3000 passengers.

Activity continues unabated at the plant of the Baldwin Locomotive Works, where every department is being taxed to its utmost in order to meet the demand for motive power. The new tank shop is fast nearing completion, some portions being already occupied. New machinery is being added, and other improvements are constantly being made in many parts of the shops in order to facilitate production. The number of employees on the rolls at the local plant has now passed the 14,000 mark, and will be increased as the various improvements are completed, it being expected that it will shortly reach a total of 15,000 employees. Inquiries are reported to be quite satisfactory, and orders for a number of locomotives have been taken. Deliveries during the past month include consignments of standard type engines, both freight and passenger, to the Chicago, Burlington & Quincy, Southern Pacific, Philadelphia & Reading, Oregon Shore Line, and numerous other railroads.

The Royersford Foundry & Machine Company, Royersford, Pa., advise us that they continue busy in all departments. The demand for shears and punches, both single and combined, has been large, and a number of orders have been entered. The foundry has been operated at its best capacity, and orders sufficient are on the books for continuous operation for some time. Among recent deliveries of punch and shears were two large machines for the Marshall & Hushart Machinery Company, Chicago, Ill.; a No. 2 combined machine to the Vesta Coal Company, California, Pa., and two machines to Manning, Maxwell & Moore, New York.

Cleveland Machinery Market.

CLEVELAND OHIO, March 28, 1903.

The Standard Welding Company maintain that the bicycle industry is far from being the dead issue that many people believe it to be, and in proof they point to an order for 40,000 sets of parts from one buyer, two orders for 30,000 sets of parts from two others, and a number of orders for from 5000 to 20,000 sets of parts from other manufacturers. The major portion of their business comes from companies outside the American Bicycle Company and if the production of the latter company comes up to their usual output, it is believed that the total production of the country will be considerably larger than it has been in several years past. In any event, it is claimed that the bicycle business is down to a good substantial basis, and is still one of the important industries of the country. The Standard Company are also devoting much attention to the production of automobile material, all of their goods embodying the electric welding process, which they have done much toward bringing to its present stage of perfection.

The Reed Machinery Company have let the contract for their machine shop and storage warehouse at Collinwood. The building will be 60 x 100 feet, and 28 feet high. It will be equipped with heavy cranes and power machinery. They will store and repair heavy machinery of all kinds.

The American Can Company are erecting a large five-story plant on Case Avenue, near the Pennsylvania Railway tracks, and will make this their most important manufacturing point.

The Cleveland Pneumatic Tool Company, manufacturers of riveters, chippers and other pneumatic tools, are now operating with a considerable force their newly completed plant located on Second avenue near the Pennsylvania Railway.

The Columbus, Buckeye Lake & Newark Traction Company, Newark, Ohio, have completed plans and broken ground for large repair shops and car house to be erected at Newark. The shops will be very complete, and will take care of repairs for the entire system reaching from Columbus to Zanesville.

Wentz & Co. of Canal Dover have been awarded the contract for the erection of the first building of the plant of the Standard Motive Power Company of New York, to be built at Canal Dover. Work on the main building is being held up by the strike of the structural steel workers. The Standard Company will erect a very large plant for the manufacture of the Dodge locomotive and other devices.

Directors of the Structural Steel Car Company of Canton have voted to increase the capital stock of the company from \$500,000 to \$1,000,000, Eastern capital having become interested in the company. It is stated that when the works have been placed on running basis the capital will be increased to \$10,000,000. The present shops will be placed in operation in the near future, and plans are being made for

large extensions. H. A. Cavnah of Canton has been elected president and William Wagner, Canton, vice-president.

The Vincent Valve Company of Sandusky have issued \$150,000 worth of bonds secured by a mortgage to the Corporation Trust Company of Delaware, and a portion of the money derived from their sale will be utilized in making extensions and purchasing new machinery. The company are considerably behind on orders, and immediate improvements are necessary.

The Toledo Mfg. Company, Toledo, have been organized by F. M. Underwood and others to manufacture marine, stationary and automobile engines and motors. The company will be incorporated under the laws of Arizona, but will establish a plant at Toledo.

The Scheidler Machine Works of Newark, Ohio, are embarking in the manufacture of traction engines, boilers, &c. They are installing new machinery, and recently ordered a 42-inch throat punch from the Cleveland Punch & Shear Works Company, Cleveland.

The New York Machinery Market.

NEW YORK, April 1, 1903.

There is no change as to market conditions. Business continues at an excellent pace, and the forecast as to future business is steadily growing brighter. The inquiry is increasing considerably, and during the last week several new propositions of good size came up for the consideration of the trade. The tone of the market is better than it has been for some time. Prices are strong, and machinery builders are beginning to comment upon the fact that their prices are not high enough to correspond with the figures they are paying for the iron which they are using. This talk is stronger than it has been at any time since the advances in raw materials. This fact can be accounted for very easily, as all machinery builders are now working with highest price iron, while at the time when iron prices were advancing a large percentage of machinery builders had a good quantity of low price iron coming through. These concerns, of course, did not advance their machinery prices to correspond with the increased market values of raw materials.

When they came abreast with the high priced iron, in actual consumption, the enthusiasm of advancing prices had subsided, and a streak of cautiousness had pervaded the atmosphere. That they are now complaining about the low prices which they are receiving as compared with the high prices of raw materials is an evidence of a marked strengthening of confidence regarding the continuance of present good business.

In connection with the report which we noted last week regarding the absorption of the De Laval Steam Turbine Company by the Allis-Chalmers Company, the indications at present point to the failure of the negotiations. F. J. Ahrend, who represents the financial interests of the De Laval companies in this country, stated that no merger has been effected, and that no negotiations with that object in view are under way at present. In connection with what may have been attempted in that direction Mr. Ahrend said he had nothing to say for publication. He stated, however, that the De Laval Company are going ahead with their plans for their plant extensions. He said that the capital of the company had recently been increased \$400,000 for the purpose of equipping new shops to produce turbines of larger capacity than the company are now capable of turning out. The plans, he said, would be ready about June 1. He stated that although the company own 15 acres of available land at Trenton, N. J., where their plant is now located, it has not been definitely decided to erect the new shops at this point.

The General Electric Company were in the market during the week for a fair sized batch of machine tools.

The Pennsylvania Railroad have just sent out a list comprising some 75 machine tools, some of which are of heavy types. The equipment is to be installed, we are informed, west of Pittsburgh.

The Delaware & Hudson are buying a nice equipment for new shops at Oneonta, N. Y.

Apocryph the proposed improvements of the New York Central Railroad, it is interesting to note that reports in financial circles state that there will soon be a new issue of the company's stock amounting to \$17,000,000 for the contemplated changes. An officer of the company is quoted as saying of the new terminal: It will be the largest passenger terminal in the world, and take in all the property now owned and leased by the Vanderbilt interests around the Grand Central Station. The plans provide for a terminal station to cover seven city blocks. The station will be 18 stories high and contain a hotel, to be known as the Twentieth Century, a theater, music hall and roof garden, and an office, &c.

Recent inquiries for machinery equipment for the Union Pacific Railroad Company have led to the revival of the report that the company intended erecting extensive new machine shops. In this connection J. B. Berry, chief engineer of the road, whose offices are in Omaha, advises us "that the Union Pacific Road has, for a number of years, been

talking of rebuilding the shops at Armstrong. The matter has not been decided, nor is there any immediate expectation of undertaking the construction of the work."

In furtherance of the plan for a municipal lighting plant for New York City, which we announced two weeks ago, the People's Institute in a large and enthusiastic meeting held in Cooper Union Sunday evening passed the following resolution:

"Whereas, Commissioner Monroe has shown the citizens of New York, in his investigations and report on the condition of city lighting, that the city is in the grasp of a strong combination which exacts exorbitant prices, and has urged the erection of a municipal electric lighting plant, as a measure of self protection, and has caused a bill to be introduced in the Legislature to give the city the necessary authority to construct it; therefore, be it

"Resolved, That this meeting of the People's Institute approves the action of Commissioner Monroe and warmly indorses the plan for a municipal electric lighting plant and demands that the State Legislature give the city the right to establish it."

We are authoritatively informed that the Western Electric Company of Chicago and New York are having plans prepared for an immense new plant to be built near Chicago. The entire outlay will amount to almost \$2,500,000, it is stated. The plant is to be devoted to the manufacture of the heavier classes of electrical machinery and supplies. The plans include a cable factory of gigantic proportions, having 150,000 square feet of floor space; a monster machine shop, a large foundry and several other buildings. The work will be handled from the Chicago headquarters of the company, C. E. Mitchell being in charge.

Specifications are now ready for the equipment to be purchased by the North Shore Power Railway & Navigation Company of 7 West Twenty-second street, New York, for the large pulp and paper mills which they intend erecting on Leven Islands, Quebec. The equipment of these mills will incur the expenditure of from \$300,000 to \$400,000. The plans and specifications have been prepared by Consulting Engineer George F. Hardy of 309 Broadway. The plant will be as thoroughly modern as up to date machinery and methods will permit. Practically all of the equipment is to be purchased in this country, despite the high Canadian duty. Contracts will be let the latter part of April.

Negotiations are still on looking toward the absorption of the Baltimore Shipbuilding & Dry Dock Company of Baltimore, Md., by the United States Shipbuilding Company. The Baltimore Company owns the Columbian Iron Works, and is capitalized at \$750,000. It is stated that the consolidation intend improving the plant considerably if the pending transaction is consummated.

Preparations are being made by the Fuller Cotton Gin Company of Memphis, Tenn., for the building of a large new plant in the South. Ground will be broken shortly for buildings which will be equipped with machinery for producing 1000 cotton gins a year. The building of these machines requires all sorts of machine tools and considerable wood working machinery. The type of machine manufactured by this company is known as the "Fuller Needle Gin," and its construction requires considerable fine machinery. James T. Fuller, the vice-president of the company, is desirous of obtaining catalogues and full details regarding metal and wood working machinery of all descriptions preparatory to the making out of his specifications.

An inquiry from the Maple Cotton Mill, Dillon, S. C., is out for equipment for two power stations and cotton mills. Each power plant is to have a 300 horse-power boiler, an 18 x 42 or 48 inch Corliss engine and accessories. The spinning and other machinery is to equip two 5000 spindle mills. Wm. M. Hamer, president and treasurer of the company, is in charge.

The Somerset Pump Company of Somerset, Pa., are in the market for a fair sized lot of machine tools. The inquiry includes a heavy lathe of 24 foot bed with taper attachment, several pump lathes, boring and drilling machines, planers, shapers, &c. The company will specialize on well drilling machinery, wind mills and pumps. E. F. Stahl is manager of the company.

S. L. Allen & Co., manufacturers of agricultural implements, whose offices are in Philadelphia and works at North Penn Junction, are looking up forging and punching presses. An extension is being built to their forging shop and another to their machine shop. They will soon be in the market for a considerable quantity of equipment for the new buildings. Samuel L. Allen is president of the company.

The Wagener Steam Pump Company of Louisville, Ohio, have been incorporated with a capital stock of \$30,000, fully paid up, and will succeed the Wagener Pump Company, formerly owned and operated by W. H. Wagener. The new organization are preparing plans for a new and modern shop building, and have already purchased some of their new machinery and are in the market for still other additional machine tools. Their plant will be equipped for the manufacture of steam pumping machinery up to a capacity of 2,000,000 gallons per 24 hours, both of the single and duplex patterns. They are in the market for a standard tubular boiler, 60 inches by 14 feet, also a 50 horse-power automatic engine.

The company manufacture steam pumps for mining, brewing, boiler feeding and general service.

The Victor Metals Company, Incorporated, of East Braintree, Mass., are making arrangements for the erection of a large building in which they will have all the facilities for the manufacturing of plates and bars, with the necessary rolling mills, annealing furnaces, &c., and they expect to be able to supply the market with plates made of the non-corrosive silver metal as well as the "Victor" bronze, anywhere from 1/4 inch thick down to No. 30 gauge, suitable for various purposes. They are at present working their foundry with a great increase of labor to 9 o'clock every night and are contemplating the increase of foundry facilities in connection with the new rolling mill plant, so as to enable us to meet the great demand for these metals. The plans for the proposed extensions are now being prepared and specifications for the requisite machinery are being made up. Victor C. Lassen is president and general manager of the company, and the directors also include: Eric H. Ewertz, chief constructor the Crescent Shipyard Company, treasurer; Charles G. Sheppard, secretary; Lewis Nixon, president United States Shipbuilding Company, and Joel F. Sheppard.

Word is being passed along in the street to the effect that the Merchants' Refrigerator Company intend doubling their large plant in Jersey City. Contracts for the equipment, it is expected, will soon be placed. It will be recalled that this company recently completed their fine new plant at a cost of about \$400,000. The Isbell-Porter Company of Newark, N. J., furnished the refrigerating machines. We are informed that work is now under way, adjoining the plant, in drilling new wells, which are intended to supply the proposed extension.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, until April 21, to furnish at the navy yard, Puget Sound, Wash., a quantity of machine tools, motor and miscellaneous supplies. Blank proposals will be furnished upon application to the navy pay office, Seattle, Wash., or to the bureau, A. S. Kenny, Paymaster-General, United States Navy.

The Garvin Machine Company of New York City have opened a showroom at 225 West Fayette street, Syracuse, for the convenience of their customers in Central New York, where a full line of their milling and screw machines, drill presses, profilers, tapping machines, &c., will be constantly on exhibition.

Pacific Coast News.

SAN FRANCISCO, CAL., March 19, 1903.—We have had sufficient rains, and everything is in the best possible shape for the crops both of cereals and fruits. The wheat crop may be reasonably expected to be larger than that of last year and the fruit crop at least equal to last year's. In other lines, such as lumber, copper and other metals and minerals, the product will be much larger.

Every week the number of building contracts is larger than that of the corresponding week last year, the month of February showing 30 per cent. more than February, 1902. Of the total February building contracts in this city more than half were of steel and brick, and it is safe to say that the value of the structural steel, etc., required for building in San Francisco for the present year will be not less than \$6,000,000. And then we must add the hardware, etc., required for all the buildings, wood as well as steel and brick, to arrive at an idea of the extent to which all this draws on the iron industry. This is for San Francisco only, and when we come to reckon the entire State the amount will be greatly increased, although the demand for structural steel is of course confined principally to San Francisco and Los Angeles. Other cities of the State have begun or have in contemplation the erection of sky scrapers, but they are confined principally to these two.

The street-car systems of these cities will need considerable quantities of rails, etc., making an additional demand on the steel trade. Then the number and capacity of the lumber mills all over the State are being increased, and here comes in a demand for all sorts of logging machinery, sawmill machinery, boilers, etc., and as there is a great deal of capital being put into this business to-day by Eastern lumbermen the present year will witness unusually large purchases in this line. The steam railroad mileage of the State will also be greatly increased. For instance, a road of about 200 miles in length is about to be built from San Francisco to the

Minarets in Madera by the Western Railroad Company. Both the Santa Fe and the Southern Pacific are at work to extend their systems to tap the immense redwood forests of Mendocino and Humboldt counties.

All the leading lumber companies are extending or about to extend their lines of road into the forests. The Hammond Lumber Company are now unloading rails in Humboldt and Del Norte counties. The Caspar Company are about to add to their lines. The Pacific Lumber Company are doing the same, and the Navarro Company are about to build a road 60 miles long to Clovedale. Rails for all these and other projects and structural steel for building are now arriving here from Antwerp or English ports. The change from American to foreign steel reminds one of old times, and makes us desire the hastening of the construction of the plants here and on the Sound, that promise to give an impetus to Pacific Coast industry.

J. O. L.

Australian Trade Notes.

MELBOURNE, February 28, 1903.—Victorian railway rolling stock is coming in for much adverse press criticism. There is no doubt that the cheese-paring-policy pursued has had the effect of permitting the rolling stock, and more especially the engines, to fall into a deplorable state. Out of something like 500 engines, nearly one-third are in disrepair. Whatever the finances of the State may be, a large expenditure in new stock is a pressing necessity. The usual procedure in engine construction appears to be to place a small order for American or English locomotives, and, using them as models, to design others therefrom suitable to Australian needs. It is a matter of some comment that, of 10 engines at present in course of construction by a local firm, the frame plates, boiler plates, bogie plates and frame stays are of German manufacture. Tenders for 39 more engines for this State are to be called for almost immediately, and, as the need for them is pressing, they may probably have to be imported, and it will behoove your locomotive builders to make inquiry, say at the Agent General's office in London, by the time this letter appears in print.

Customs decisions affecting hardware imports during the month have been as follows:

Lead piping, encased in an iron pipe, free.

Overhead motion, a machine fixed at a distance for transmitting power to a lathe, 12½ per cent.

Cutting and stamping machines for can making, 12½ per cent.

Milk coolers, 12½ per cent.

Back chains, with plate attached, for tailboards of vehicles, free.

Handles for smoothing irons—iron, free, as part of the smoothing iron; wood, 15 per cent.

Plate bending machines, 12½ per cent.

Malleable cast iron fittings for pipes, 20 per cent.

Engineering shops are mostly working short time and short handed. The works of Mephan Ferguson, of Melbourne, are one pleasing exception to the general rule. Mr. Ferguson is a large government contractor, and is at present engaged in turning out, among other lines, some seven miles of his specialty—light steel spiral riveted pipes for water supply purposes. His works at Perth, Western Australia, are also working full time on similar contracts.

Furnace operators at Ironton, Ohio, have given blast furnace labor an increase of 25 cents a day for turn men and 15 per cent. for laborers. This advance will probably prevent a strike, as the men had threatened to stop work unless given more pay.

A St. Petersburg cablegram, dated March 28, states that a great strike riot, accompanied by much bloodshed, has occurred at the town of Slatousk, in the Government of Oufa, among the Ural Mountains. Twenty-eight persons were killed and 50 others were wounded by the gendarmes and troops in suppressing the riot. The strike started in the State Iron Works, where 500 men walked out, demanding the release of three of their comrades who had been arrested.

HARDWARE.

MANY merchants look askance on the system of rural postal delivery, finding that in various ways it runs counter to their interests and in not a few instances tends to diminish the volume of their business. The project of establishing the parcels post as a regular feature of the postal service of the country awakens many apprehensions because of the facilities and opportunities it would give to mail order houses. Whatever may be the future place in business life of these measures, there is no doubt that as a general rule any such departure from the usual course of things tends to unsettle existing methods and to turn trade into new channels. This principle is illustrated in the comparatively recent innovations of the telephone and the trolley line, which have taken a permanent place in our civilization and are accepted without opposition. They have each of them done something to change the volume and the movement of trade. The trolley line has not only opened up new territory, making it more accessible to the neighboring towns and cities, but has at the same time and in corresponding measure taken the business from those who previously had enjoyed it. In a similar manner but in a less obvious degree the telephone has rendered tribute to the enterprising merchants who were prompt to avail themselves of its use and in this way get into close touch with those in private residences and in business houses whom they were in a position to serve. Many of our readers can bear witness to the success with which this instrument of communication has been utilized and the substantial increase in business which is directly traceable to it. The greater facility of movement afforded by the local trolley service and the manner in which the merchant and many of his customers are brought into close relations by the telephone make it possible to transact a larger volume of business, while there is in connection with their use a material economy in time and labor. It behooves every merchant and manufacturer to be on the alert to discover opportunities resulting from occurring changes, of which these are simply examples, and to adapt his methods to the altering conditions of business. It is those who are most prompt to avail themselves of such opportunities who usually reap from them the largest results. Many merchants are laboriously trudging along near the rear of the procession while some of their wide awake fellows are riding in the band wagon.

Condition of Trade.

The advance of the season naturally brings with it a quickening in the demand for goods, both from the merchants for the completion of their stocks and from the purchasing public as the products of the factory enter into consumption. While the increased activities, which in the present prosperous condition of things are stimulated by the coming of warmer weather, contribute in many ways to a larger business, the attention being given to agricultural matters has some influence in deterring trade, which, of course, is an eminently healthful and desirable interruption, full of promise for the future, and which carries with it a demand for Tools and Appliances connected with agricultural pursuits. Meanwhile the demand for household articles, goods which enter into buildings, Tools and Mechanical Supplies and other classes of goods is excellent. The calls made upon the merchants from manufacturers and foundries indicate the prevailing activity and the steady, if not high,

pressure under which production is being carried on. There is a good deal of difficulty in obtaining goods and some complaints are heard on this score. On the whole, however, it would appear that there is less trouble in this regard than last season. This is not on account of a diminution in the demand so much as in the increase which has taken place in the manufacturing facilities of the country. Nearly all manufacturers, in fact, have enlarged their plants or at least made modifications in them by the addition of new machinery and improved appliances by which they can turn out a greater quantity of goods, and the market naturally feels the effect. Fortunately, with the great volume of current business, this is an improvement, and there is practically no evidence of an oversupply. Prices, too, continue firm and in some lines strong. It is a further matter for congratulation that the general conditions throughout the country remain similarly satisfactory and promising.

Chicago.

(By Telegraph.)

The month of March has proved unusually satisfactory to the Hardware interest as far as the volume of business is concerned, some of the local jobbers reporting heavier shipments during the past month than during the corresponding month a year ago, while one or two report the largest distribution of goods in their history. Manufacturers, aside from the difficulties they have experienced in assembling raw material and the annoyance in making shipments, have also experienced an unusual degree of prosperity. Both the combination and independent mills are in possession of orders which will keep them busy for several months, and the new business in sight is still considerable. The nearby mills of the Steel Corporation were again compelled to shut down for several days during the week because unable to obtain an ample supply of Rods, the South Works of the Illinois Steel Company being obliged to turn their capacity largely upon Billets to supply the Milwaukee Works. Some little improvement is again reported in regard to the number of shipments of manufactured products, but the situation is still provokingly abnormal. The largest interests manufacturing Wire Fencing report that although present capacity is 50 per cent. greater than a year ago, they are still far behind in the shipment of orders. In Heavy Hardware the volume of business has increased, and a further hardening tendency has been noted in various departments. Tin Plate has met with a very active demand, and the tone of the market is stronger, with an upward tendency. Roofing Supplies are being distributed actively. Manufacturers of Hot Pressed Nuts have noted a further revision of prices, Square now being quoted at a discount of \$5 to \$4.90 and Hexagon at \$5.20 to \$5.10 from list, Tapped being 20 cents higher. Wrought Iron Washers, full kegs, have also advanced, the discount now being \$5 to \$4.80. A further advance is also noted on Copper Sheets and Copper Bottoms. Spelter Slabs are 5 cents higher, carload lots now being \$5.40. A great scarcity has been developed in Wire Cloth, it being impossible to get shipment from manufacturers, and jobbers' stocks are much reduced. The price at Chicago has been advanced to \$1.15. Much the same condition prevailed at the corresponding time a year ago. It was thought earlier in the season that there would not be a repetition of the scarcity experienced a year ago, but the delays at mills have doubtless been responsible for this condition. It is notable that while some manufacturers of Stove Boards have advanced prices 10 per cent., jobbers' prices are still under manufacturers' quotations. Cut Nails have been advanced 5 cents during the week. There has continued to be an active distribution of Steel Goods and Carpenters' Tools. Shipments of Refrigerators, Ice Cream Freezers, Lawn Mowers and such seasonable goods are being made as rapidly as transportation facilities will allow. Manufacturers of Stove Pipe, Axes and kindred goods for fall delivery note an increasing number of orders. Manufacturers of Builders' Hardware report further important orders for shipment from stock, one

or two stock orders having been received during the week, and several important contracts for equipping large buildings, both in Chicago and at other Western points, are pending.

St. Louis.

(By Telegraph.)

The strength and vim in the buying movement have been well sustained to the close of March, and the St. Louis jobbing trade are much encouraged when viewing the present status of the market. The recent severe floods in the South have been an unfavorable feature, and some diminution in trade from the affected sections is the natural sequence. But when conditions shall assume normal shape again the damage will have to be repaired, necessitating the purchasing of large quantities of such items as Barb Wire, Staples, &c. The usually bad condition of the roads in many sections at the end of winter somewhat retards business, but the advent of good weather will soon improve matters and have the effect of further stimulating trade in all lines. Advance in the price-list of Carriage, Tire Machine and Stove Bolts has been announced the past few days. The movement of all Wire products is said to be specially good at this time, and while manufacturers are reported to be running to full capacity jobbers are complaining of their inability to get stocks fast enough to supply their trade.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Quite considerable activity has been shown in trade circles in our city during the past week. The spring season is practically some two or three weeks in advance of what is usual for Agricultural Tools, consequently orders have been coming in quite heavily for these goods. We regret to say that so far as our experience goes, or we might add, so far as the experience of those in our city goes, jobbers are not helped by the combination on these goods, and locally not so well supplied as we were on former occasions, when each manufacturer had control of his own works, consequently stock has not been received from manufacturers as early as usual nor as complete as usual, although we all have promises that we will be stocked at an early date; but retailers do not look upon that as a satisfactory answer when gardening is being done and Forks and Rakes are wanted. We hope for improvement, however, when the combination, or trust, is in better running order.

The several advances that have taken place within the last few weeks on leading goods only confirm what we indicated in our letters earlier in the season. The manufacturers of these leading goods state that they are several months behind their orders, and there is every indication that all the goods that have recently advanced will be held firm in prices.

The heads of the departments of the railroads leaving our city promise a greater supply of cars within the very near future. This will be appreciated by not only the shipper but the receiver of the goods, as it will enable goods to reach their destination more quickly than has been the case for some months past.

Louisville.

W. B. BELKNAP & Co.—Bright skies and drying winds have worked a wonderful change in this part of the country the last ten days. Roads are beginning to be passable and the farmers' wagons are coming to town. That is the sort of movement that counts a good deal in the general business of the country and beats the booming of stocks in Wall Street for substantial results.

Still, we are not without our financial interests out here; particularly as money is becoming more and more available in the smaller centers. The Louisville & Nashville Railroad is to spend this year some \$10,000,000 for improvements of its lines. These looked like big figures to us but a few years ago; they sounded chimerical enough when we heard them as applied to Pennsylvania or the New York Central systems. It only goes to show how fast we catch on to the ideas of the leaders in such matters. We are only proud that our own Southern roads have at last these few millions to spend,

as the improvements have long been needed and recognized.

The river is within its bounds and affords a most happy solution, not only to the plowed grounds along its banks (which we get the benefit of in our drinking water), but also to the congested car yards. The flotillas which pass here almost daily in charge of some great tow boat are evidences of wealth which cannot go unnoticed, and their easy transportation is a matter of congratulation.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The Hardware business in March has been somewhat of a surprise to the trade in this locality. The first two weeks in March we had rain every day, and this, in addition to an unusual amount of rain in the latter part of February, put the small streams past fording and the roads in worse condition than they have been for a decade. Notwithstanding this the orders for Hardware have come right along and everything now indicates that March will be as heavy a month in the Hardware business as the trade in this section have ever experienced.

The cold weather in February damaged the peach and apple crop, and the heavy frosts this week have injured the strawberry crop. We have a large acreage of wheat, which looks unusually well for this season of the year. Prices are fairly well maintained. Collections are good, and so far as we are able to see prospects for future business are excellent.

Boston.

BIGELOW & DOWSE COMPANY.—The season is two or three weeks in advance of former years. The roads are well settled and the frost is out of the ground. During the past week we had several days of summer weather, when the mercury indicated over 60 degrees.

Trade in all branches has felt the impetus of the early spring, and orders for seasonable goods as well as for the general line of Hardware are coming in in good volume.

Prices in all lines are very firm and advances are well maintained. The new association of Screw Manufacturers have the market well in hand, as they control all the factories making a complete line. Prices will naturally rule higher for some time to come, and dealers with good stocks are to be congratulated.

The manufacturers of Carriage and Machine Bolts, Lag Screws and Stove Bolts have made material advances. Zinc and Lead are scarce and advancing.

Trade the past month is in excess of last year, and the prospects for the future are encouraging.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY. — The month of March closes with a noticeable improvement in the volume of business being transacted. The near approach of spring weather appears to be influencing buyers to increase their purchases, and from now on it is predicted that a heavy business will develop all along the line.

Conditions underlying the present situation appear to be satisfactory, and the outlook for the future is quite promising, with the general position becoming intrinsically stronger as the open season advances.

Cleveland.

THE W. BINGHAM COMPANY.—The trade during the past two weeks with Cleveland jobbers has been exceedingly good. We are very fortunately situated, being up on high ground, and are not troubled with floods or wash-outs as our Southern friends are, of which we hear so much complaint. We extend to them our sympathy and hope the floods of water will soon subside, and that in place of a deluge they will have a flood of orders coming their way.

A large tonnage of Hardware is going out of Cleveland at the present time, particularly Wire and Nails, Pipe and the like—orders that were taken early for shipment in March and April. There is also a large amount of House Trimmings, general Hardware, mining and milling supplies going through.

Our greatest trouble has been to keep up assortments, but the manufacturers have been quite liberal with us, and we now have accumulated stocks of many goods, and are in good shape to take care of our friends' orders. Most all of the first or stock orders for Screen Doors and Windows, Lawn Mowers, Wire Cloth and Netting have gone forward, and now customers begin to think of sorting up in these lines, and with the approach of fine weather these duplicate and general assorted orders will come to us in large volume.

A large amount of business will be done along the Great Lakes and their tributaries on the opening of water navigation in about two or three weeks. Collections are quite satisfactory; money seems to be plentiful and customers take advantage of the cash discount quite freely.

Portland, Oregon.

CORBETT, FAILINC & ROBERTSON.—There is little that is new to report in the Pacific Northwest since our last. The weather has been too much like summer to stimulate trade, as farmers are all too busy with home affairs to be able to go to town. This state of affairs will be to our advantage later as crops will all be in the ground early, and that foreshadows a good harvest.

Taking into consideration above drawbacks, business is good for the season. Collections have been so far in excess of normal that a let up is noticeable. This, however, is accounted for partly by its being the time of the year when taxes go delinquent, and they are all rustling tax money rather than looking after overdue accounts.

NOTES ON PRICES.

Wire Nails.—Demand keeps up well, and the market is strong at present quotations. An outside mill have been quoting \$2.05 as their lowest price for two or three weeks, and it is understood that they are sold ahead for two or three months. Improvement in delivery is noticed in so far as isolated cases of lost cars are not so frequent, but there does not appear to be much general improvement in shipments being received promptly. Quotations are as follows:

Jobbers, carload lots.....	\$2.00
Retailers, carload lots.....	2.05
Retailers, less than carload lots.....	2.15

New York.—Local demand continues steady, and small lots of Nails are going out quite freely from store. Quotations are more closely adhered to than for some time, and are as follows: Single carloads, \$2.20; small lots from store, \$2.25 to \$2.30.

Chicago, by Telegraph.—While the mills have been able to make larger shipments because of the improved car situation recently, the difficulty of assembling raw material, especially Rods, has been discouraging for the prompt fulfillment of accumulated orders. Independent as well as combination mills are still booked far ahead, and considerable new business is still in sight. Under the circumstances the market remains strong, sales being made on the basis of \$2.15 to \$2.20, in carload lots, f.o.b. Chicago.

St. Louis, by Telegraph.—Wire Nails are moving in good volume and jobbers experience no difficulty in selling them as fast as they can secure shipments from the mills. Small lots from store sell at \$2.35.

Pittsburgh.—Demand for Wire Nails is active, and the mills are filled up mostly on old contracts for the next several months. A good many new orders are being placed, and the tone of the market is very firm; in fact, one or two leading outside mills are quoting \$2.05 minimum. Spring trade promises to be large, and there may be a shortage in supply, some of the mills already being considerably behind in shipments. Prices are firmly held, and are as follows: Wire Nails \$2 in carloads to jobbers, \$2.05 in carloads to retailers and \$2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days; for Galvanizing Nails 75 cents per keg is charged and for Tinning Nails \$1.50 per keg extra.

Cut Nails.—At the meeting of the Cut Nail Association held last week an advance of 5 cents per keg was made, to be in force during the month of April. At the

meeting it developed that a majority of the manufacturers were in favor of an advance. Before this advance it had become an established fact that those wanting Cut Nails were willing to pay an advance in price over Wire Nails for them. Quotations are as follows: \$2.15, base, in carloads, and \$2.20 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Some of the jobbers put the advance of 5 cents per keg into effect on March 26, while others made no changes in their prices until April 1. There are likely to be some irregularities in prices for a week or so until the assortment of stocks bought before the advance becomes broken. With this exception the tone of the market is firm. Quotations for carloads and less than carloads are as follows:

Carloads on dock.....	\$2.29
Less than carloads on dock.....	2.33
Small lots from store.....	2.40

Chicago, by Telegraph.—The Cut Nail Association advanced prices 5 cents during the week, the market being firm at the advance with a good demand. It is still almost impossible to obtain prompt shipment; in fact, some local concerns report that orders for Iron Nails placed last fall have not been filled. The jobbing trade has been more active and the market has ruled strong on the basis of \$2.30 in carload lots and \$2.35 in less than carload lots for Steel, Chicago. Iron Nails are quoted at \$2.50 to \$2.55 per keg from store.

St. Louis, by Telegraph.—Jobbers report a well sustained demand for Cut Nails and prices remain firm. Steel at \$2.40 and Iron at \$2.55.

Pittsburgh.—At a meeting of the Cut Nail Manufacturers' Association held on Wednesday, March 25, the report of which was too late to go in last week, the price of Steel and Iron Cut Nails was advanced 5 cents per keg for April shipment. The market is firm and the demand is quite large. It is understood that a few of the larger Cut Nail manufacturers were opposed to any advance in prices, but some of the mills insisted that the present high prices for Steel and fuel warranted an advance. We have revised quotations, and quote as follows: Steel Cut Nails, \$2.15, base, in carloads and \$2.20 in less than carloads; Iron Cut Nails, \$2.25, base, in carloads and \$2.30 in less than carloads, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—New business at the mills is largely confined to small lots, moderate in amount, coming from the smaller trade. Large buyers are drawing on contracts previously made. The tone of the market is firm. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.30	\$2.60
Retailers, carload lots.....	2.35	2.65
Retailers, less than carload lots.....	2.45	2.75

Chicago, by Telegraph.—The situation is extremely strong and it is not improbable that the increased cost of manufacture will be reflected in the selling price in the near future. There is still much difficulty in making shipments, although some improvement is noted. Specifications on old contracts continue heavy, but the smaller volume of new business is encouraging rather than otherwise. Galvanized continues to sell at \$2.80 in carload lots and \$2.90 in less than carload lots. Staples are in good demand at \$2.35 in carload lots and \$2.45 in less than carload lots, Chicago.

St. Louis, by Telegraph.—The demand on the jobbing trade for Barb Wire is of generous proportions. Scarcity of supply is evident and shipments are slow in coming forward from the mills. Painted is quoted at \$2.65 and Galvanized at \$2.95 in small lots from store.

Pittsburgh.—A fair amount of new business is being placed, but the mills are running mostly on old contracts taken in January, before the advance in prices was made. The mills are well filled up for several months, and the condition of the Barb Wire market is very satisfactory. Prices are firmly held. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, \$2.30; Galvanized, \$2.60, in carloads to jobbers;

Painted, \$2.35; Galvanized, \$2.65, in carloads to retailers; Painted, \$2.45; Galvanized, \$2.75, in small lots to retailers.

Plain Wire.—Large buyers are sending in specifications liberally on contracts made some time ago with the mills. A moderate amount of new business is being placed. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95
Less than carloads.....	2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	10	11	12	12½	13	14	15	16	
Base.	\$0.05	.10	.15	.25	.35	.45	.55		Plain.
	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	Galv.

Chicago, by Telegraph.—While shipments are reported to be improving, the suspension of work for several days recently placed the mills almost as far behind as ever. The market continues strong and prices remain unchanged, as follows: Nos. 6 to 9 on the basis of \$2.05 to \$2.10 in carload lots on track, and \$2.15 to \$2.20 in less than car lots from store, Galvanized bringing 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

St. Louis, by Telegraph.—Strong and favorable demand rules for Plain Wire and prices are firm. Several sizes are hard to obtain from the mills and jobbers are experiencing some trouble on this account. No. 9 is quoted at \$2.25 and Galvanized at \$2.55 from store, in small lots.

Pittsburgh.—A good many orders are being placed for

Plain Wire, and specifications on old contracts, taken some time ago, are coming forward freely. Spring trade promises to be fully up to or larger than in previous years. Prices are being firmly held, and we quote: Plain Wire, \$1.90, base, for Nos. 6 to 9 in carloads to jobbers, \$1.95 in carloads to retailers and \$2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Cordage.—The demand for Rope continues steady, and of fair volume. The lowest quotations on both Sisal and Manila have been advanced ¼ cent per pound. Quotations are as follows: Manila Rope, on the basis of 7-16-inch and larger, 11½ cents. Sisal Rope is made to a price; the quotations on the above basis range from 8¼ to 10 cents per pound, according to quality. Both kinds of Rope are subject to a rebate of ¼ cent per pound in large quantities.

Sheet Copper.—The manufacturers of Sheet Copper on March 26 advanced the base on Sheet Copper 1 cent per pound on all sheets lighter than 96 ounces per square foot. Ninety-six-ounce Copper and heavier than 75 pounds to the sheet, 30 x 60 inches, is unchanged at 20 cents per pound. It was found that an adequate product was not being obtained from the raw material used that would be in proportion to the base sizes, and that this advance in a portion of the list was necessary to maintain a proper equilibrium. In other words, it is not the advances in Ingot Copper, but the cost of the processes of manufacture that is given as a reason for the readjustment. The various manufacturers have issued revised quotation sheets in accordance with the above action. In the table given herewith we show the extras beyond the base price of 20 cents for various sizes, gauges, &c.:

SHEET COPPER EXTRAS.

Sizes of sheets.		96 oz. and over	64 oz. to 75 lb. sheet, 30 x 60 and heavier.	32 oz. to 64 oz. sheet, 25 to 50 lb. sheet, 30 x 60.	24 oz. to 32 oz. sheet, 18¾ to 25 lb. sheet, 30 x 60.	16 oz. to 24 oz. sheet, 12½ to 18¾ lb. sheet, 30 x 60.	14 oz. and 15 oz. sheet, 11 to 12½ lb. sheet, 30 x 60.	12 oz. and 13 oz. sheet, 9½ to 11 lb. sheet, 30 x 60.	10 oz. and 11 oz. sheet, 7¾ to 9½ lb. sheet, 30 x 60.	8 oz. and 9 oz. sheet, 6¼ to 7¾ lb. sheet, 30 x 60.	Lighter than 8 oz.
Extra cents per pound advance over base price.											
Not wider than 30 inches.....	Not longer than 72 in....	Base.	1	1	1	1	2	3	4	7	10
	Longer than 72 in....	Base.	1	1	1	1	2	4	7	10	....
	Not longer than 96 in....	Base.	1	1	1	1	3	7	....	....	....
	Longer than 96 in....	Base.	1	1	1	1	3	7	....	....	....
Wider than 30 inches but not wider than 36 inches.....	Not longer than 72 in....	Base.	1	1	1	1	3	5	8	11	....
	Longer than 72 in....	Base.	1	1	1	1	3	7	10	....	....
	Not longer than 96 in....	Base.	1	1	1	1	3	7	10	....	....
	Longer than 96 in....	Base.	1	1	1	2	4	....	....	....	....
Wider than 36 inches but not wider than 48 inches.....	Not longer than 72 in....	Base.	1	1	2	3	5	8	11	....	....
	Longer than 72 in....	Base.	1	1	2	4	6	9	....	....	....
	Not longer than 96 in....	Base.	1	1	3	5	9	....	....	....	....
	Longer than 96 in....	Base.	1	1	3	5	9	....	....	....	....
Wider than 48 inches but not wider than 60 inches.....	Not longer than 72 in....	Base.	1	1	2	4	7	12	....	....	....
	Longer than 72 in....	Base.	1	1	3	5	10	....	....	....	....
	Not longer than 96 in....	Base.	1	2	4	7	....	....	....	....	....
	Longer than 96 in....	Base.	1	2	4	7	....	....	....	....	....
Wider than 60 inches but not wider than 72 inches.....	Not longer than 96 in....	Base.	1	2	4	9	....	....	....	....	....
	Longer than 96 in....	Base.	1	3	6	11	....	....	....	....	....
	Not longer than 120 in....	Base.	1	3	6	11	....	....	....	....	....
	Longer than 120 in....	Base.	1	3	6	11	....	....	....	....	....
Wider than 72 inches but not wider than 108 inches.....	Not longer than 96 in....	Base.	1	2	4	9	....	....	....	....	....
	Longer than 96 in....	Base.	1	2	4	9	....	....	....	....	....
	Not longer than 120 in....	Base.	1	2	4	9	....	....	....	....	....
	Longer than 120 in....	Base.	1	2	4	9	....	....	....	....	....
Wider than 108 inches.....	Not longer than 132 in....	Base.	4	5	7	....	....	....	....	....	....
	Longer than 132 in....	Base.	5	6	9	....	....	....	....	....	....
	Not longer than 132 in....	Base.	4	5	7	....	....	....	....	....	....
	Longer than 132 in....	Base.	5	6	9	....	....	....	....	....	....

Rolls Round Copper, ¾ inch diameter or over, one (1) cent base per pound advance. (Cold Drawn, Square and Special Shapes, extra.)
 Circles, Segments and Pattern Sheets, three (3) cents per pound advance over prices of Sheet Copper required to cut them from.
 All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.
 All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.
 Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.
 All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.
 All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.
 Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

All Sizes Tinning.

Tinning Sheets on one side, per square foot, 2½ cents.

For Tinning both sides, double the above price.

For Tinning Circles and Segments, price 2½ cents per square foot upon square of the circle—i. e., a 12-inch circle is considered 1 square foot.

For Tinning the edges of sheets one or both sides, price the same as for Tinning all of one side of the specified sheet.

Extras—Copper Bottoms, Pits and Flats.

Extra cents per pound advance over base price of Soft Copper.

Cents.		Cents.	
14 ounces to square foot, and heavier, per pound.....	5	10 ounces and up to 12 ounces.....	8
12 ounces and up to 14 ounces to square foot, per pound.....	6	Lighter than 10 ounces.....	11
Circles less than 8 inches diameter, 2 cents per pound additional. Circles over 13 inches diameter are not classed as Copper Bottoms.			
Polished Copper Bottoms and Flats, 1 cent per pound in addition to regular price.			

Axes.—During the past two or three weeks, since the announcement of prices by the Axe manufacturers, there has been no very material change in the condition of the market. The prices announced have been, on the whole, surprisingly well maintained. The trade, however, have been rather conservative in placing orders, there being a general feeling that prices are not likely to be higher, with a possibility in case competition between the manufacturers should become acute that there might be a break in the market. The volume of business is accordingly rather moderate. Conferences have several times been held between the manufacturers, with a view to keeping things in their present condition, and a regard for their own interests as well as for the trade at large is inducing earnest efforts to keep the market steady. The success which has attended these efforts is regarded as promising well for the future, and the trade will be glad to recognize the fairly satisfactory conditions which prevail. Some of the manufacturers who regard the existing prices as unreasonably low advise us that they are making little effort to effect sales, anticipating that the production of the manufacturers who are now actively in the market will be absorbed before long and that they will be given an opportunity to sell their goods at higher prices than are now ruling.

Bright Wire Goods.—Higher prices are announced by the manufacturers of Bright Wire Goods, and this line is more regular in price than of late. At the low quotations which have been ruling a considerable volume of business was transacted.

Stove and Tire Bolts.—A substantial advance has been made by the associated manufacturers in the prices of Stove and Tire Bolts. The general discount on Stove Bolts has been made 80 per cent., and on Tire Bolts 72½ per cent., further discounts being given on good orders in addition to quantity rebates.

Shot.—The Shot market continues to be characterized by a firm tone, and the recent advance to \$1.50, base, is well adhered to. The successive advances which have taken place afford the jobbing trade an opportunity to undersell the manufacturers.

Wire Picture Cord.—A decided improvement is noticeable in the market for Wire Picture Cord, and the manufacturers have been withdrawing their extreme prices and announcing materially higher quotations. In a general way the market may be referred to as represented by the discount of 85 and 10 to 85 and 20 per cent., although lower prices are often made by jobbers who have stocks on hand purchased at lower figures.

Binder Twine.—The International Harvester Company announce the new schedule of prices for Binder Twine, effective April 1, f.o.b. Chicago, in less than carload lots, as follows:

	Cents per lb.
Jute	8¼
Sisal	10½
Standard	10½
Standard Manila, 550 feet.....	11¼
Manila	12
Pure Manila.....	13
Carload lots, ¼ cent per pound less.	

April 1 had been the date set when the combined factories would announce prices. The majority of orders taken without price in the West, it is understood, called for April 1 as the date upon which the price was to be quoted, when if satisfactory to the buyers the orders were to stand. Thus the long wait for the announcement of prices is ended, and Binder Twine business can be carried forward intelligently.

Glass.—It is reported, upon what is considered reliable authority, that the signatures of from 75 to 85 per cent. of the Glass manufacturers outside the combined factories have been obtained to an agreement to close down all Glass plants on April 18. Such an arrangement puts the Glass market in a very satisfactory condition, and precludes any demoralization of prices in the near future. It is also reported that manufacturers state the next allotment of Glass will be higher in price than that charged for the last. The survival of the Glass

jobber is a question which will probably present itself for solution. It is understood that some of the officials in the combined companies are not in favor of selling direct to the retail trade, while others are of the opinion that such would be the best policy. The suggestion has been made that the jobbers might form a big stock company for controlling the sale of all the Glass manufactured. It is reported that the American Window Glass Company are now preparing to install their Glass blowing machines in all of its best tank plants, and that they expect to produce as much Glass from 14 of these factories as they did when they operated every tank and pot factory now controlled by them. This they expect to do at a large decrease in the cost of their product. Demand is very light at this point, but it is stated that prices are being maintained. Quotations of the jobbers' association, for either single or double strength, are as follows:

	Discount.
From store.....	.90 and 10 %
F.o.b. factory, carload lots.....	.90 and 20 and 2½ %
F.o.b. factory, 2000-box lots.....	.90 and 25 %

Oils.—*Linsced Oil.*—There has been a perceptible falling off in the demand for small lots of Oil during the week, and this at a time when the commencement of out door painting would be supposed to result in increased buying. Large consumers are depending almost entirely upon their contracts to cover their requirements. While there has been no change in official quotations, the market is weak, owing to the declining tendency of the seed market. Quotations, according to quantity, are as follows: City Raw, 46 to 47 cents; out of town Raw, 43 cents per gallon.

Spirits Turpentine.—The market at this point is quiet, demand being confined to small lots. Prices remain unchanged as follows, according to quantity: Southern, 68½ to 69 cents; machine made barrels, 69 to 69½ cents per gallon.

KEEPING LARGE CATALOGUES.

THE HART & COOLEY MFG. COMPANY, New Britain, Conn., keep a number of catalogues to which they make frequent reference in a section from a sectional bookcase, which is fastened to the wall by shelf



Keeping Large Catalogues.

brackets, convenient to a desk, as shown in the accompanying illustration. This method might be suggestive to retail merchants as a way of keeping their catalogues which protects them from dust and dirt. If one section is not sufficient to accommodate the catalogues, one or more sections can be placed on top of it at any time, as desired.

Jones Hardware Company, Dalhart, Texas, have been incorporated with a capital stock of \$50,000. Their business is both wholesale and retail.

HARDWARE WINDOW HINTS.

BY L. C. PECK.

ONE cannot make an attractive display without its costing something, fresh Paint, cloth for background, a good deal of time, &c. Whatever you do with your window be original. By that I do not mean that it is not right to accept suggestions from the trade papers, &c., but that if your competitor puts out a display of Brushes, do not copy after him, or if he has been original in an idea, let him have it in peace, for a while at least.

DISPLAYS.

I find that a Cutlery display is as attractive and profitable as any. For this I take a yellow or a light purple background, as either color will set off a japanned as well as a Nickel Shear, and an Ebony as well as a Pearl Handled Knife. Let the manufacturer's mark be conspicuous in this display.

In a display of a Cook Stove, have the background made up of Kitchen Utensils. For a Heating Stove window arrange Rugs, Stove Boards, Coal Hods, &c.

I find that in a display of Lawn Mowers it pays to get sod and make the floor of the window look like a lawn. If plenty of dirt is left on the sod and it is kept well watered and cut, the window will attract a great deal of attention. If you have the room, get some potted plants and make a flower garden, and then use the small garden and flower bed Tools as a background. Put in as many Lawn Mowers as your window will allow, of different styles and varying prices.

In a display of Tin Ware suspend the small Tin articles in festoons across the top of the window, or from opposite corners. The same may be done with Granite and Aluminum Wares with profit. If your window is large enough, show all the articles of Iron, Tin, Granite, Nickel Plate and Aluminum to be found in a model kitchen.

Until a few years ago our Christmas trade was like the oyster in a boarding house soup, "not in it," but for the last two or three years we have made an extra effort during the holiday season with our windows, and I know that we have had our share of the trade, if not more. In this display we use evergreen and cotton for the background and show a lot of both necessary and desirable articles, such as Roasters, Flour Sifters, Meat Choppers, Carving Sets, Nickel Plated Coffee and Tea Pots, Oil Heaters, Soapstones, &c.

A REBUS.

When trade is a little quiet and you wish people to know and remember that you still do business at the old stand, display a rebus, offer a prize to the guesser or to the one who comes the closest to solving it, and you will be surprised at the interest shown. In the rebus convey some thought about your place of business and make this part simple, so that it can be made out by everybody.

EXHIBITING PRIZES.

Look out for prizes to be offered in your town for races or other contests, get them, if possible, displayed in your window, then add a few neat Hardware specialties on the side. I do not think it advisable to put prices on the articles displayed unless you offer something very cheap and build the whole display on that order. It gives your competitor an advantage over you and defeats your very purpose.

KEEPING WINDOW LIGHTED AT NIGHT.

Keep the window well lighted because it attracts more attention and shows to better advantage the articles to that class of workmen who do not see them during the day. Look out for the evenings when the public will be out later than usual, and have your window particularly attractive and lighted all night if necessary.

KEEPING FROST OFF THE WINDOW.

Keeping frost off of the window in winter is quite a problem. I have seen a plan tried that worked fairly successfully. A Gas Pipe was laid along the front of the window, as shown in the accompanying sketch, but it was not placed too near to the glass for fear that the

heat would crack it. Holes are bored in this Pipe about 2½ inches apart, through which the gas passed. If instead of this, Connections and Burners were put in, and Reflectors be placed so as to shield the eyes of the



Keeping Frost Off the Window.

passers-by from the light, the window might be well illuminated and the frost kept off at the same time.

NEW ENGLAND HARDWARE DEALERS' ASSOCIATION.

THE spring meeting of the New England Hardware Dealers' Association will be held at the United States Hotel, Boston, Mass., Wednesday evening, April 8. The subject for discussion is "How to Improve, Create an Interest, Increase and Generally Obtain the Best Results from Our Association." President Sayward hopes that every member will attend the spring meeting and come prepared to say something for the good of the association.

THE AMERICAN TOOL CHEST COMPANY, 200 West Houston street, New York, who at one time were considering a proposition to join the consolidation of Wood and Iron Toy manufacturers, under the style of the National Novelty Corporation, have decided not to do so. They will continue to market their product as heretofore, through the jobbers and trade in general. They have a complete line of Tool Chests, from the smallest Toy Chest to the largest for journeymen mechanics and amateurs, in the finest finishes, both with and without Tools. They are well equipped to make prompt deliveries and will be pleased to hear from old friends and new customers.

THE VAN CAMP HARDWARE & IRON COMPANY, Indianapolis, have increased their capital stock from \$150,000 to \$500,000, of which \$200,000 is preferred stock of new issue, bearing 6 per cent. and offered at 105. The company have decided to erect new buildings on the site recently purchased at Missouri and Maryland streets. The main building will be eight stories, 195 x 200 feet, of brick and stone, and will cost \$100,000.

O. M. Scott & Bro., Marysville, Ohio, have bought the Hardware and Farm Implement stock of their competitor, Justice Schelderer, which has been consolidated with their large line of Builders' Hardware, Buggies, Wagons, Stoves, &c.

Ernest MacMillan has purchased the Rundorff Hardware store at Burlington, Iowa. Mr. MacMillan will make a number of improvements in the store with a view to bringing it up to date in all its appointments.

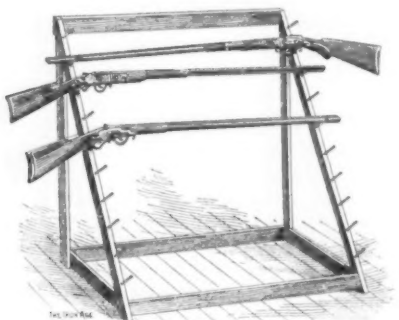
Hamilton-Messenger Company are successors to Hamilton & Hamilton, Oskaloosa, Iowa. The company handle Shelf Hardware, Stoves and Tinware and Sporting Goods.

Graham Hardware Company, Graham, N. C., have incorporated with a capital stock of \$10,000. They will do a retail business in Hardware, Stoves, Agricultural Implements, Sporting Goods, &c.

Johnson & Son have been succeeded in the Hardware business in Ware, Iowa, by Wolkenhauer & Co.

A WINDOW RACK FOR GUNS.

IN displaying Guns in a show window P. J. Bolan, Waterbury, Conn., occasionally uses a rack, as shown in the accompanying illustration. This rack is made entirely of wood and holds ten Guns. When the rack is placed in the

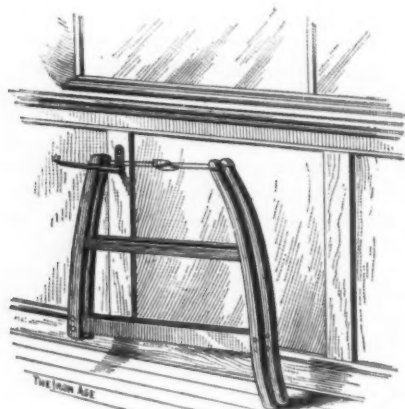


A Window Rack for Guns.

window Guns are placed in a horizontal position on the pegs, one Gun being pointed to the right, the next to the left, the next to the right, and so alternating until the rack is filled. This method of exhibiting Guns is an excellent one, as it not only attracts attention to the display, but shows each individual Gun to advantage.

DISPLAYING BUCK SAWS.

IN the store of the Danbury Hardware Company, Danbury, Conn., Buck Saws are kept in the salesroom in the manner shown in the accompanying illustration. A large harness hook is fastened to the front of the coun-



Displaying Buck Saws.

ter in the back of the store. Over this are placed the Buck Saws, as shown, the handle end being permitted to rest on the floor.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Henry Brown has disposed of his interest in the firm of Mueller & Brown, Abilene, Texas, which is now being conducted under the style of O. Mueller & Son. Mr. Brown has removed to Coleman, Texas, where he has opened up in the same line under his own name. He requests catalogues, &c., relative to Shelf Hardware and House Furnishing Goods.

F. P. Willis & Son, Ponchatoula, La., dealers in General Hardware, Farm Implements, Harness and furniture, request copies of catalogues, price-lists, &c.

Knight & Wall Company, P. O. Box 711, Havana, Cuba, will be pleased to receive catalogues and price-lists on general Hardware and Machinery.

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Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Handling Steel Shafting.

We are in receipt from a prominent jobbing house of the following inquiry in regard to methods of handling Steel Shafting:

We should like to ask whether any of your readers handle Tongs for lifting Finished Steel Shafting. It comes to us in carloads, covered with grease and a natural adherent dirt, and is difficult and dangerous to handle by reason of its very liberal lubrication. Do not some of the larger handlers of this material employ Tongs or some device of that kind which will save the men the dirt and danger that they are unnecessarily subjected to?

PUSHING SPECIAL LINES.

The fact is quite well recognized that almost anything that is well advertised can be sold. This knowledge can be utilized to make quick disposition of lines of goods which for any reason it is found desirable to push. As an instance of this a New Hampshire concern advertised \$2.50 Combination Repair Outfits for \$1.25. This included three Outfits in one—Cobbler Mender, Harness Mender and Tinware Mender. An illustration of the Outfit was shown with a list of the tools included in a newspaper advertisement. In five days the concern received 94 orders by mail from different sections. Outfits at \$1 and \$1.25 were advertised at the same time with good results. A newspaper advertisement showing nine styles of Horse Blankets, with prices of each, brought the same concern large returns at another time. The same was true of Cutlery advertisements and of general Christmas goods. These advertisements occupied from 60 to 90 square inches of space in the local papers.

Pfeiffer & Parsons, Hardware and furniture; W. L. Mills, dry goods and clothing; F. J. Galley, hats, caps, boots and shoes, and Bard & Gates, groceries, flour and feed, Gordon, Neb., have consolidated their interests under the style of The Fair, which has been incorporated with the following officers: W. L. Mills, president; F. J. Galley, vice-president; W. W. Parsons, secretary, and Otto Pfeiffer, treasurer. The formation of this company has been due to the extreme competition which prevailed in the town, the grocery concern handling Enamelled Ware, the Hardware firm flour and feed, &c., a situation which materially diminished profits. With the new departure a much more satisfactory condition of affairs is anticipated.

McCoulsky-Bourn Company, Rockwall and Heath, Texas, have been incorporated with a capital stock of \$15,000, all paid up. The officers are as follows: W. T. Bourn, president; Mart McCoulsky, vice-president; Alexander Martin, secretary. Among the lines carried by the company are Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Buggies, Wagons, &c.

The Chappuls Hardware Company, Rayne, La., have been incorporated with a capital stock of \$50,000, and will conduct the wholesale and retail business, principally the latter, in Shelf and Heavy Hardware, Stoves and Tinware and Sporting Goods. The company will carry a complete stock in these lines, using the goods purchased from Aug. L. Chappius as a basis.

James Small, Idaville, Ind., has disposed of the Hardware part of his business to his brother, John N. Small. The former will confine himself to the Buggy and Fencing business, which he will push more energetically than heretofore.

CONNECTICUT STATE ASSOCIATION OF RETAIL HARDWARE DEALERS.

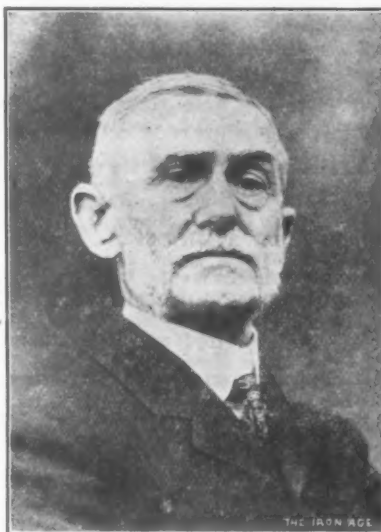
CONNECTICUT has fallen into line with a Hardware association, which promises to develop into one of the most useful and energetic in the country, with a membership which comprises many of the most influential and important retail houses in the State. The officers who have been chosen are men of much ability and high position in their several communities, and take hold of the



A. H. ABBE, President.

work of retail organization with enthusiasm and intelligence, so that the association is regarded as having been inaugurated under exceptionally favorable auspices.

The meeting for the formation of the association was held at the Hotel Russwin, in New Britain, on Wednesday, 25th ult. It was called to order by A. H. Abbe, president of the Hartford Hardware Association. Mr. Abbe was chosen temporary chairman, and Charles L.



W. A. CHURCH, First Vice-President.

Way of Hartford temporary secretary. Mr. Abbe presented Mayor Bassett of New Britain, who welcomed the visitors. Mr. Bassett said that he was delighted at this opportunity to meet the Hardware dealers of the State, and he hastened to give them the mythical key of the city. The fact that the Hardwaremen selected New Britain for a meeting place only confirmed his previous

opinion of their intelligence. New Britain was the center of the Hardware manufacturing trade and it was in proper harmony that the dealers, the men who handle the goods, should meet there. The Mayor said that he understood that arrangements had been made to show the Hardwaremen the *modus operandi* of the local manufacturing concerns and he trusted that their visit would be of profit to them.

Mr. Abbe made a brief explanation of the purpose of the meeting, which was primarily to form a State organization. Nearly every State in the Union, he said, has such an organization. They do good work. Such an organization gives the Hardwaremen a chance to get bet-



CHAS. G. AGARD, Second Vice-President.

ter acquainted. It is proper that the Hardwaremen of the State should know each other. There is not a better class of business men in the State than the Hardware dealers, and they should be banded together. Mr. Abbe then called for opinions from the gentlemen present.

W. A. Church of Derby advocated the organization. He made a motion that the meeting proceed to the formation of a State association. The motion met with unanimous favor.

Merchants Present.

The following firms were represented at the meeting:

THE WAY HARDWARE CORPORATION, Hartford, C. L. Way, S. L. Way.
A. H. & E. W. ABBE, New Britain, A. H. Abbe, E. W. Abbe.
PRESTON BROS., Norwich, Chas. H. Preston.
DANBURY HARDWARE COMPANY, Danbury, A. R. Jones, J. R. Hill.
F. S. BIDWELL & CO., Windsor Locks, J. D. Phelps.
HORACE K. BRAINARD, Thompsonville.
BIRDSEY & RAVEN, Meriden, Eli C. Birdsey.
HERBERT F. CLARK, Willimantic.
F. F. HITCHCOCK & SON, Woodbury, F. F. Hitchcock, H. S. Hitchcock.
DICKERMAN HARDWARE & SUPPLY COMPANY, Wallingford, Geo. E. Dickerman.
F. T. BLISH HARDWARE COMPANY, So. Manchester, F. T. Blish.
LOCKWOOD & PALMER, Stamford, Henry Lockwood, F. W. Palmer.
JORDAN BROS., Willimantic, F. D. Jordan.
R. I. BARBER, Rockville.
G. M. WILLIAMS & CO., New London, L. B. Crosby.
H. CHAPMAN & CO., Stafford Springs, T. M. Lyon.
S. A. WELDON & SON, Bristol, M. E. Weldon.
JAYNES HARDWARE COMPANY, Greenwich, F. W. Jaynes.
THE F. HALLOCK COMPANY, Derby, Conn., F. W. Hallock, W. A. Church, E. J. Higby.
D. N. CLARK, Shelton, W. E. Hueston.
L. L. ROSENBERG & CO., New Haven, L. L. Rosenberg.
THE N. T. RUSHNELL COMPANY, New Haven, W. H. Burchell.
THE LIGHTBOURN & POND COMPANY, New Haven, B. C. Lightbourn.
T. P. TERRY & SON, Ansonia, F. T. Terry.
AGARD HARDWARE COMPANY, Torrington, Chas. G. Agard.
CONNECTICUT HARDWARE & PAINT COMPANY, New Haven, F. C. Leighton.
LYON & GRUMMON, Bridgeport, F. M. Lyon.

RALPH E. PAGE, Hartford.
CLAPP & TREAT, Hartford, Geo. D. Clapp.
ROBT. C. WITTE, Hartford.
WOOLLEY HARDWARE COMPANY, Hartford, Jos. C. Woolley.
DICKERMAN & POND COMPANY, Winsted, S. F. Dickerman.
THE JOHN E. BASSETT & CO., New Haven, Geo. J. Bassett.
HERBERT L. MILLS, New Britain.
LYON & EWALD, New London, Mr. Lyon.
NOXON & WHITNEY, Middletown, Jos. J. Noxon.
TRACY, ROBINSON & WILLIAMS, Hartford, W. D. Williams.
EATON, CHASE & CO., Norwich, Mr. Hough.

The following firms signified their intention of joining the association, although not able to attend the meeting:

T. HAWLEY & CO., Bridgeport.
HULL BROS. & CO., Danbury.
FRANCIS & CO., Hartford.
CHURCH & MORSE, Meriden.
F. J. WHEELER, Meriden.
GEO. H. BAKER & CO., New Haven.
W. A. WARNER & BRO. COMPANY, New Haven.
J. L. RAUB, New London.
FULLER & PEET, Canaan.
HUBBELL & STAPLES, Norwalk.
J. W. BEARD, Plainville.
HOTCHKISS BROS. COMPANY, Torrington.
D. B. WILSON COMPANY, Waterbury.
WATERBURY HARDWARE COMPANY, Waterbury.
G. H. ALFORD, Winsted.

After the appointment of committees on Nominations and Resolutions and By-Laws a recess was taken for an hour.

Officers Elected.

The Committee on Nominations reported the following officials, who were unanimously elected:

PRESIDENT, A. H. Abbe, New Britain.
FIRST VICE-PRESIDENT, W. A. Church, Derby.
SECOND VICE-PRESIDENT, Chas. A. Agard, Torrington.
SECRETARY, Chas. L. Way, Hartford.
TREASURER, Geo. J. Bassett, New Haven.

DIRECTORS.

One Year: W. H. Burchell, New Haven; F. W. Jaynes, Greenwich; F. D. Jordan, Willimantic; A. H. Bishel, Middletown.



GEO. J. BASSETT, Treasurer.

Two Years: D. B. Wilson, Waterbury; C. H. Preston, Norwich; Eli C. Birdsey, Meriden; Henry Lockwood, Stamford.
Three Years: F. M. Lyon, New London; J. R. Hill, Danbury; Geo. E. Baldwin, Bridgeport; F. T. Terry, Ansonia.

Resolutions and By-Laws.

The following resolutions and by-laws, reported by the committee, were unanimously adopted:

PREAMBLE.

The Connecticut State Association of Retail Hardware Dealers is an organization intended to include in its membership all legitimate dealers in Hardware in the State of Connecticut who conduct their business in a manner not prejudicial to the general welfare of the

Hardware trade, all membership being subject to the approval of the Executive Committee before final acceptance. The trade has long recognized the necessity for co-operative work in protection against trade abuses. It is the purpose of the Connecticut State Retail Hardware Dealers' Association to furnish such protection as far as possible. As such protection is only obtainable through the medium of a large and interested membership, we earnestly invite the attention of all dealers who are not members, to the end that they may see the necessity of joining their influence to ours in this work.

RESOLUTIONS.

Whereas, Some manufacturers and wholesale dealers in General Hardware, Stoves, Tinware and kindred lines persist in selling their lines through prejudicial channels to our injury and detriment, placing us toward our customers in the light of extortioners, causing endless trouble, and

Whereas, The system of protecting us from this wrong is ineffective, it is absolutely necessary to perfect such a system by united action which will remove these evils from which we have suffered for years; therefore, be it

Resolved, That the members of this association confine the purchase of Hardware, Stoves, Tinware and



CHAS. L. WAY, Secretary.

kindred lines, as far as practicable, to manufacturers and wholesale dealers who sell goods to firms that are regularly engaged in the retail Hardware business, as defined in these resolutions.

Resolved, That it is the sense of this association that the interpretation of the term "retail Hardware dealer," as set forth in the above resolution, to entitle him to purchase Hardware, Tinware and kindred lines, be construed to mean any person having an established place of business and carrying a line of Hardware, Stoves, Tinware and such goods as are usually kept in a first-class Hardware store, excepting in places where there are no regular Hardware stores. General stores who do not use the line in a way that demoralizes the trade and any other store not objectionable to the regular dealers in such territory shall be construed as legitimate.

Resolved, That it is not the intention of the above resolutions to prevent the interchange of goods mentioned between manufacturers and wholesale dealers in such goods, or for export trade, and that the further interpretation of these resolutions is hereby vested in the Executive Committee with power. The following are exempt from these resolutions: The United States Government, steam railroads and such manufacturing industries and companies as the Executive Committee may approve, for such goods as are necessary for their respective lines of business.

Resolved, That any manufacturer or jobber in Hardware, Stoves, Tinware or kindred goods furnishing net prices or any discount from list prices contrary to the foregoing resolutions, either by themselves, employees or agents, shall be considered as disapproving the above resolutions.

Resolved, That this association shall as far as lies in its power keep a record of all goods sold and by whom sold, through prejudicial channels, and of all other violations of these resolutions.

Resolved, That every member of this association is

constituted a committee of one and is expected to report to the proper officers any violation of these resolutions.

Resolved, That it is the sense of this association that bids direct to consumers or contractors by jobbers on manufacturers upon any kind of finishing or rough Hardware entering into the construction of buildings are injurious to the retail trade and that all such bids should be made by or through a regular Hardware dealer.

Resolved, That all meetings of the State Association should be closed meetings and that the published reports of the proceedings of same should be under the supervision of a press committee.

Resolved, That these measures are just and necessary for our welfare, and it is expected that their rigid enforcement will be observed.

Resolved, That this convention indorses the above and urges its officers to use their best efforts to bring about the further formation of State associations so as to insure a greater national association, with the end in view that a uniform system of protection for the trade will prevail throughout the country.

Resolved, That it is not the object of this association to control prices, this feature being left entirely to local organizations.

Resolved, That it shall be the duty of officers of this association to effect the organization of local bodies in such cities and towns as are not already organized and to do everything possible to add to our membership.

By-Laws.

ARTICLE I. NAME.

The name of this association shall be the Connecticut State Association of Retail Hardware Dealers.

ARTICLE II. OFFICERS.

The officers of this association shall be: One president, two vice-presidents, one secretary and one treasurer, who shall be elected by ballot at the regular meeting in each year.

ARTICLE III. ORDER OF BUSINESS.

The order of business shall be:

1. Roll call.
2. Naming committees.
3. Reading of minutes of last regular and called meetings.
4. Reports of committees.
5. New or unfinished business.
6. Propositions for the good of the association.
7. Adjournment.

ARTICLE IV. MEETINGS.

The regular meetings of this association shall be held between January 20 and March 10 in each year, the precise date and place being left to the Executive Committee.

ARTICLE V. MEMBERSHIP.

Any person or company who are now or shall hereafter engage in the retail Hardware business and carry a full and complete assortment of the same may become members of this association by making application to the secretary and paying into the treasury the amount of dues prescribed in the by-laws.

ARTICLE VI. ADMISSION FEE AND DUES.

The admission fee to membership shall be \$3, payable in advance, which fee shall include the dues until the regular meeting following and shall include a dinner. The annual dues shall be \$3, payable at each regular meeting.

ARTICLE VII. COMMITTEES.

There shall be a Board of Directors, consisting of 12 members elected at the organizing meeting, 4 to serve one year, 4 to serve two years, 4 to serve three years. At subsequent annual meetings 4 members shall be elected to hold office for three years, to take the place of those whose terms then expire.

The president shall appoint an Auditing Committee of three, who shall serve during his term of office.

ARTICLE VIII. DUTIES OF OFFICERS AND COMMITTEES.

Section 1. It shall be the duty of the president to preside over all regular and called meetings, to exercise supervisory control over the affairs of the association, to carry out and enforce all measures adopted by the association and to fill all vacancies in the offices by appointment until the next annual meeting.

Sec. 2. It shall be the duty of the vice-presidents to officiate for the president in his absence or disability.

Sec. 3. It shall be the duty of the secretary to keep accurately the minutes of all regular and called meetings of the association; to take charge of and settle all questions of dispute or otherwise that may be referred to him; to keep correct account of all money received and disbursed; to issue certificates of membership to all members and to render a correct itemized account of the same to the association at its regular meetings, and to

perform such other duties as may be requested of him from time to time.

Sec. 4. It shall be the duty of the treasurer to receive all moneys from the secretary and to pay out the same on the order of the president and Executive Committee.

Sec. 5. It shall be the duty of the Board of Directors to act in conjunction with the officers in the general supervision of the association, and to make a report of the same at the next regular meeting, and to approve of all applications for membership.

ARTICLE IX. VOTING.

Section 1. Each person or firm holding membership shall be entitled to one vote only on all subjects and at the election of officers.

Sec. 2. All questions introduced by motion shall be decided by a majority vote of all members present.

Sec. 3. All changes in the constitution and by-laws shall require a two-thirds majority vote of all members present.

ARTICLE X. AMENDMENTS.

Thirty days' notice shall be given to the association of any proposed change in the constitution and by-laws.

ARTICLE XI. QUORUM.

Ten members in good standing in the association shall constitute a quorum.

Seven members of the Executive Committee at called meetings shall constitute a quorum.

ARTICLE XII. REPRESENTATION.

All persons, firms or companies holding membership shall be represented at any regular or called meeting in person and not by proxy.

ARTICLE XIII. OFFENSE.

In case of a violation of the resolutions of this association by any Hardware manufacturer or jobber, thereby affecting the business of any member of this organization, the member shall call on or correspond with such manufacturer or jobber and endeavor to adjust the same, and if not satisfactorily adjusted, he shall then notify the secretary of his action, giving sufficient evidence as to the facts in the case, who shall immediately take the matter up, and if not then adjusted the secretary shall present the matter to the National Association for adjustment, and if not satisfactorily settled shall notify each and every member of the association, who shall discontinue to patronize such manufacturer or jobber.

ARTICLE XIV.

By subscribing to the constitution and by-laws persons, firms and corporations thereby agree and are pledged to conduct their business in accordance with the same. They also agree to carry out explicitly all requests of the Executive Committee, especially in matters relating to the violation of the constitution and by-laws by jobbers and manufacturers, or resolutions adopted at any regular meeting of the association.

Summer Meeting.

The matter of holding a meeting during the summer was discussed, and it seemed to be the sense of those present that such a meeting should be held. The determination of the matter was left in the care of the Board of Directors.

The selection of time and place of the annual convention was also left in the hands of the Board of Directors.

Addresses.

Addresses on the subject of the work of the association and the lines on which it should be conducted were made by E. W. Birdsey of Meriden, F. T. Terry of Ansonia, Geo. J. Bassett of New Haven and R. R. Williams, Hardware Editor of *The Iron Age*.

Entertainment and Luncheon.

Before adjournment President Abbe announced that the manufacturers of New Britain had invited the members of the association to be their guests at luncheon in the Russwin. About 75 persons were seated at the tables, which were laid out in the form of a U. At the head table sat Mayor Bassett, L. H. Pease of the Stanley Works, Chas. F. Smith of Landers, Frary & Clark, President Abbe and R. R. Williams. The luncheon was an elaborate one and very much enjoyed. At its conclusion many of the members visited the factories, forming or renewing acquaintances with the manufacturers, with so many of whom they have business relations, and took the evening trains home, with very pleasant impressions of their visit to New Britain.

JOHN B. F. CHAMPLIN.

JOHN B. F. CHAMPLIN, president of the Catta-raugus Cutlery Company, Little Valley, N. Y., died at his home, Saturday, March 21, of neuralgia of the heart. He had not been in good health for several months, and was taken suddenly and severely ill the Wednesday preceding his death.

Mr. Champlin was born in Napoll, N. Y., July 17, 1841. His paternal ancestors were of French Huguenot origin, coming to America in 1695 and settling in Lebanon, Conn. The name was originally Champlain, and Samuel de Champlain, the famous French navigator and explorer, who founded Quebec in 1608 and discovered the lake which bears his name in 1609, was a remote kinsman.

Mr. Champlin remained at home until his mother died, when he was 15 years old. At the age of 13 he was a partner with his father and older brother, dealing



JOHN B. F. CHAMPLIN.

in cattle and sheep. When 16 years old he was a half owner of a vessel engaged in cod fishing. At the end of the season he disposed of his share of that enterprise and returned to his native town, resuming the trade in live stock and subsequently passing several winters in lumber camps, driving oxen.

In 1866 Mr. Champlin commenced to travel for the house of Friedmann & Lauterjung, New York importers of Cutlery, continuing with them until 1882, when he started in business for himself in Little Valley, taking into partnership his son, Tint Champlin, the title of the firm being J. B. F. Champlin & Son. In 1879-80 he built the Little Valley Opera House, which he reserved for the free use of religious and benevolent societies. In 1887 he bought the machinery and tools of the Beaver Falls Cutlery Company, after which he began to manufacture Cutlery in Little Valley.

Mr. Champlin was twice married, his last wife having died in 1899. He is survived by three children. His son, Tint Champlin, late secretary of the company, and who, assisted by the treasurer, A. E. Darrow, has had charge of the active management of the business for several years, was elected to his father's place as president at a recent meeting of the company's directors.

Wilson Hardware & Furniture Company and Dawley Hardware & Furniture Company, Rocky Ford, Col., have consolidated under the style of the Dawley-Wilson Hardware & Furniture Company. H. A. Dawley is president of the new concern and B. G. Wilson vice-president and treasurer.

PRACTICAL POINTS FOR THE HARDWARE WINDOW.

BY NEW SOUTH.

DON'T make a practice of using your windows to display shop worn goods in the hope of forcing the sale of them. You will only succeed in making the public think that your display is a fair sample of your entire stock. Occasionally it may be desirable to show such goods, but special mention of the fact should be made. The prices, plainly marked, should be low enough for any one to understand that it is a special sale. It is desirable also to state that the sale is for the purpose of making room for new stock.

A CENTRAL ATTRACTION.

Every window should have a central piece to catch the attention of the shopper, and the surrounding articles should bear some relation to it. For example, a medium size Stove might be placed on a raised platform and the other articles, tastefully arranged around it, should be essentially Kitchen Goods and Stove Trimmings. It would be only distracting attention to show Padlocks, Pocket Knives or Carpenters' Chisels in the same window.

VARIETY ESSENTIAL.

Variety in style of window dressing is essential to attractiveness. Let one display be a neat arrangement of Cutlery, plenty of Knives, Forks, Spoons, &c., tastily arranged, having for a central figure the word "Cutlery"



Fig. 1.—Stimulating the Curiosity of Passers-by.

made of the articles shown. The background and floor covering should be some heavy, dark material, such as dark blue velveteen. Follow this with a radical change. Have a background of white or light colored material. Set on a platform a solitary attractive nickel trimmed small Stove. Have nothing else in the window save a neat card reading about as follows:

This Stove, \$15.00, is merely a sample of our stock. We have many more inside at a variety of prices.

Next, if you have, as you should have, a set of movable fixtures bring them into use and show a window arranged with them, displaying suitable goods. Continue changing the style of display. Occasionally show a designed window, such as a kitchen complete, if the window is large enough, using Range, Boiler, Sinks, and all utensils well distributed on table and walls, as they would be in a real kitchen. Make it look as natural as possible, even at an expense of a few dollars for carpenter work. Topical designs are always winners if properly worked out, though they require great ingenuity.

MECHANICAL DISPLAYS.

With electricity in such common use mechanical shows are easily and cheaply arranged, and can periodically be used to advantage. A $\frac{1}{4}$ horse-power motor can work a light shaft under or at the top of the window, and it is then only a matter of a few feet of round or narrow belting to put in operation a Churn or Ice Cream

Freezer, or set in motion the wheels of a Bicycle, on which can be placed the figure of a boy or girl.

PASSERS-BY MADE CURIOUS.

A novelty, to be used but very rarely, is to cover the front of the window on the inside to a distance of, say, $4\frac{1}{2}$ feet from the sidewalk by pasting white paper on the glass, then leave a clear space of, say, 18 inches and cover up to the top, as shown in Fig. 1. Have the interior of window well lighted, displaying such goods as wished. Any suitable wording may be painted on the paper. Few will pass without satisfying their curiosity.

MICE IN THE WINDOW.

In Fig. 2 is shown an arrangement that can be made and placed in the show window which will not fail to attract a large number of people. A French Mouse Trap

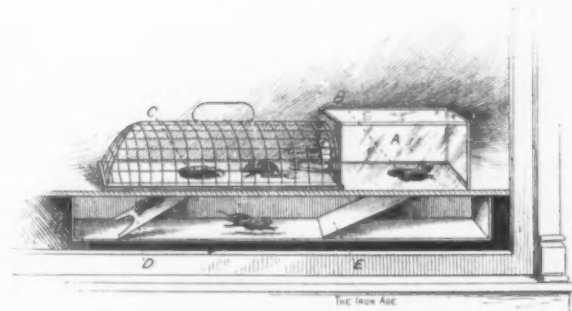


Fig. 2.—Mice in the Window.

is fastened on the top of the box, as illustrated, and from the entrance of the Trap a glass hood, A, runs, covering the ragged looking mouse hole B. A hole, C, is cut in the floor of the Trap, from which runs the gangway D to the floor of the box. Another gangway, E, leads from the floor of the box to the hole B. If five or six mice are placed in the box they will run up the gangway E, through the hole B, through the hood A, into the Trap, down the gangway D, and so around again and again, forming a display that always commands attention. White mice if used will appeal to some people more than the ordinary gray ones.

Novelties, however, are for occasional use only; the conventional will be found to pay the best. Let your window be so arranged as to catch the eye. The usefulness of the goods and the price will draw the customer into the store, and that is the object of the window display.

MARKING PRICES.

Mark prices on at least 95 per cent. of the goods shown. Use your judgment about the other 5 per cent.

It would, for instance, be poor policy to mark something 50 cents when you know a nearby competitor has received a stock of the same goods and would promptly display his at 47 cents.

Let your price cards be of modest size and proportionate to the size of the article.

The Choctaw Hardware Company, Caddo, Ind. Ter., have been succeeded by Diffenderffer-McBride Hardware Company, who have been incorporated with a capital stock of \$15,000, W. R. McBride being president; D. M. Diffenderffer, vice-president, and H. W. Diffenderffer, secretary and treasurer. The business is wholesale and retail, and the line handled comprises Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c. A large additional warehouse has just been finished.

The Central Hardware Company, Lorain, Ohio, have been organized. The company have purchased the stock and fixtures of T. H. Artress, succeeding to his business. This stock has been increased, and will be still further enlarged during the spring. J. H. Hills, president of the company, was formerly a member of the firm of Chapman & Hills. O. T. Dellenbaugh, secretary and treasurer and also manager of the business, has had five years' experience in the wholesale and retail Hardware business and 12 years' connection with railway supply departments.

TRADE ITEMS.

OAKMAN BROS. COMPANY, 123 Chambers street, New York, have moved to 45 Murray street, for the purpose of increasing their facilities and acquiring more room. This concern were founded in October, 1896, by F. H. Oakman, and are managed by Clarence J. Walker. They carry a complete line of L. & G. Mfg. Company's Table, Butcher, Druggists' and Painters' Knives and Supplies, Holley Mfg. Company's Pocket Cutlery, H. H. Mayhew Company's Fine Tools, Robert Murphy's Paper Knives, &c., and the National Cutlery Company's line of Fine Scissors. They are now distributing a fine catalogue, just published, of the Lamson & Goodnow Mfg. Company, Shelburne Falls, Mass., manufacturers of fine Table Cutlery.

THE GRANGER LOCK & HINGE COMPANY, LIMITED, Grand Rapids, Mich., have been incorporated with a capital stock of \$110,000, \$60,000 paid in. The additional \$50,000 stock is held in the treasury subject to the action of the Board of Directors. The company will manufacture Locks and Hinges, as well as Brass Novelties for equipping refrigerators, sideboards, wardrobes and furniture which requires ornamental Locks and Hinges. The Lock is of special design, attached automatically, held in place without screws and cannot be removed when locked. Alvinza M. Granger is president, James Stewart, treasurer and general manager, and Eustis W. Tower, secretary.

THE WAGNER & MARSHALL COMPANY, Chicago, have been incorporated with a capital stock of \$5000, the incorporators being J. B. Marshall, A. W. Wagner and Earl McCook. The company will do a manufacturing and distributing business, being selling agents for the following companies: Geo. H. Smith Steel Casting Company, Milwaukee; C. S. Smith Mfg. Company, Milwaukee; Chicago Flexible Shaft Company, Chicago; the Pittsburgh Shovel Company, Pittsburgh; Cuyahoga Wire & Fence Company, Cuyahoga Falls, Ohio; Cleveland Wire & Spring Company, Cleveland; Elliott & Blair Steel Company, New Castle, Pa.; Ohio Galvanized & Mfg. Company, Niles, Ohio; Rockford Tack & Nail Company, Rockford, Ill.; Western Malleable & Gray Iron Company, Milwaukee; Wallmann Mfg. Company, Milwaukee.

THE WILKE MFG. COMPANY, manufacturers of Porcelain Refrigerators, Anderson, Ind., have established a salesroom at New York City. The company will carry a full stock of Porcelain and Crystal Refrigerators, catering to the city retail trade and distributing to the Eastern and New England wholesale trade from New York City. The New York office will be under the management of W. S. Hueston. The company advise that the principal object in establishing headquarters at New York is to get in touch with the leading architects and builders, with the idea of supplying special Refrigerators for residences, apartment houses, institutions, &c. In the New York salesroom will be elaborately displayed Glass Lined Trade Coolers, designed for grocers and markets. The company announce that they will soon add a very important feature to their business, being the installation of small mechanical refrigerating plants in connection with their line of goods, thus giving the modern merchant needing refrigeration the opportunity to make himself entirely independent of ice.

R. W. SUNASACK, manufacturer of Razor Strops, has moved to larger quarters, 773-775 West Chicago avenue, Chicago, Ill., the change being necessary because of the rapid increase in the growth of the business.

THE UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn., and 313-317 Broadway, New York, have just issued for gratuitous distribution among the trade handling Firearms and Ammunition a handsome display hanger. It is 24 x 17 inches, and shows a laughing girl in khaki Rough Rider coat and campaign hat, carrying on one shoulder a box of 500 U. M. C. Factory Loaded Nitro Club Shotgun Shells. The hanger can be had for the asking.

W. ARTHUR POTTER has purchased the business of the Knap & Pratt Mfg. Company, at Geneva, Ohio, and will continue it under the name of the Potter Mfg. Com-

pany. The line of goods manufactured includes small Garden Tools, Kitchen Hardware, &c.

THE COLUMBIAN HARDWARE COMPANY, Cleveland, Ohio, and 14 Warren street, New York, have issued the third and fourth numbers of "Timely Rhymes, by Old Timer," for gratuitous distribution. Volume III is entitled "The Workingman and Other Verses," Volume IV including the "Jingle of the Tools," "Be Honest and Advertise," and "That Twenty-Four Mills." The company are receiving many complimentary letters in connection with these 12-page booklets, asking that the writers be put on the mailing list so as to receive them regularly.

THE WOOSTER HARDWARE COMPANY, Wooster, Ohio, issue a large illustrated folder, tied together with a carriage whip snapper, announcing their sixth annual opening, to be held April 9, 10 and 11, 1903. The return of the snapper, accompanied by a circular inclosed in the folder, entitles any adult to a Whip on any of the above dates. Former openings held by this company have resulted, they advise us, in increased business and an enlarged acquaintance.

DE WITT WIRE CLOTH COMPANY.

DE WITT WIRE CLOTH COMPANY, 17 Warren street, New York, are now erecting a new two-story factory building adjoining their plant at Belleville, N. J., a suburb of Newark, the business being originally established in 1805 and incorporated in 1876. The new building will be used both for manufacturing and the carrying of larger stocks of Wire Cloth and Brass and Copper Wire. Their producing capacity will be largely increased by the addition of a number of power looms of the most modern construction. Their capital stock has been increased by the issue of \$50,000 in new 6 per cent. cumulative stock, making their entire capital stock \$250,000. The New York warehouse, 17 Warren street, will be discontinued, but the executive office will still be at that address as in the past. Being so close to New York, they can deliver orders taken one day on the day following.

WARNER & HAVILAND.

WARNER & HAVILAND, 88 Chambers street, New York, who have been established at the above address for five years as manufacturers' representatives in general Hardware, will on or before May 1 move to 17 Warren street, near Broadway, where they will have the store floor and two basements for the carrying of larger stocks of the manufacturers represented by them. This concern were recently incorporated with a capital stock of \$25,000, all paid in. The directors, as formerly, are Norman Warner, J. E. Haviland and Somers Foster. At a meeting held March 31, the following officers of the company were elected: Norman Warner, president; J. E. Haviland, treasurer, and Somers Foster, secretary.

HARDWARE CLUB.

At a meeting of the governors of the Hardware Club, held Thursday, March 26, the following officers were elected to carry on the club for the ensuing year: President, Richard R. Williams; vice-president, J. Leonard Varick; secretary, Arthur G. Sherman, and treasurer, Thomas F. Keating. The group of five governors elected at the annual meeting March 21 was the same as before, with the exception of James H. Kennedy, who declined re-election as a governor, and was succeeded by William Bishop of P. & F. Corbin. Mr. Kennedy's retirement was accepted with regret, as he has been an efficient officer of the club and has contributed to its success from its organization.

A. W. Murphy, Shenandoah, Iowa, has been succeeded by Clovis & Gage, who will continue the Hardware, Stove, Sporting Goods and furniture business. The old stand has recently been much enlarged and the store is now 50 x 120 feet, two stories and basement.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

CHAPTER XII. Complaints on Field Reports.

THE clerk in charge of this work should be a person of discretion and possess some authority, particularly when it comes to the consideration of complaints. It is not infrequent that the man of accounts in a jobbing house, who is anxious to make a favorable showing in his interest and discount account, makes too strict rulings, and by the imposition of some petty charge for interest on an overdue account alienates a good customer. Or, again, misunderstandings arise between the sales department and the customer, and the sales manager is often unable to see any reason for giving way, and sticks for a minor point to his house's disadvantage.

Sales Managers and Managers of Accounts Must Have Rules

for the conduct of their business and to be consistent must enforce them, but there must be at times discretion used in the manner of enforcing them and a flexibility that will give way in the face of necessity. In one instance within the writer's knowledge two years' business with a Hardware house was lost through a refusal to allow a claim of \$10 on a Bicycle deal. The account footed over \$1000 a year. When through the routing clerk's investigations the bottom of the matter was reached and the allowance made the account was resumed. In another instance a dealer claimed the right to return a Range and receive a credit of about \$30. Under the terms of the purchase as the order was written he had a right to so expect, but it was ambiguously worded and the jobber gave it a different interpretation and refused the claim. This account was much larger than the other one mentioned and was lost by the sales manager's stand. The dealer honestly thought himself in the right, and as a matter of policy it would have paid richly to allow his claim. Even had he been wholly wrong, so long as he thought himself in the right and to yield did not involve any general policy, it would have been best to yield.

Interference an Extreme Measure.

Now this does not mean that the managers of the departments are to be lightly overridden. It is probable that occasions for interference will occur in the largest houses not over three or four times a year, and then usually to right some old wrong or to wipe out some old score when it has been demonstrated that by such a measure only can harmony be restored, and even then the yielding of the disputed point should be made through the manager of the department interested and thus save his authority.

Causes for Trouble.

The most prolific causes for trouble in the order of their importance are:

1. Interest charges on overdue accounts.
2. Credits and allowances for returned goods and reductions in price.
3. Shortages and back orders.
4. Delays in shipment and in transit.

Feeling the Pulse of His Trade.

Ordinarily complaints on any head are reported through the usual channels and receive attention at the hands of the department managers. They should not appear upon the field records until a dispute in settlement threatens to break off trade, and then should have prompt attention. Or it may be that some feature which is a serious hindrance to trade over a specified route or through some particular territory finds expression here and demands attention from the general management. Delays in shipment constantly reported as a menace to trade require investigation, and if the house system of getting out orders is found slow it should be reformed. Delays in transit, when they are

epidemic, call for an inspection of routes and a comparison of time in transit by the different roads. Undue dissatisfaction with methods pursued in making collections requires investigation to see if the manager of this department is not pursuing banking methods too closely; the same is true of other conditions that may be developed. By following these up closely the jobber can keep in closer touch with his territory and the conditions affecting business therein than would be otherwise possible.

Tend to Better Service.

Besides the settlement of specific complaints and the consequent harmony in his relations with the trade the jobber gains from these field records a fairly accurate idea of the way his service compares with that given by others. If complaints become epidemic along any one particular line he can rest assured that some one else is outstripping him and it behooves him to make an improvement in this one regard. There is a constant strife to shorten the time of delivery, to give better packages, better goods, lower prices—in short, to excel competing houses in those particulars which make the jobber's services of value. It is by watching his competitors that a jobber learns where he stands in comparison, and if he falls short in any important particular these reports soon indicate it.

A Territorial Test.

Again, through these field records and the complaints therein he can gauge the value of the territory. If time, terms or prices are against him in any particular territory and the handicap is serious enough to cause the salesman to note it in his records it is up for investigation; if he can remove the hindrance and thus approach the trade on something like an even basis he may consider the territory as legitimately his; if he cannot, and the hindrance is a serious one, he may know that he has gone beyond his territorial limit. He will naturally find from his lack of sales that the territory is unprofitable without these records, but they enable him to intelligently figure its value and to develop its resources to the utmost.

ABERCROMBIE & FITCH'S NEW CATALOGUE.

ABERCROMBIE & FITCH, now thoroughly established in commodious quarters at 314-316 Broadway, New York, formerly at 2 South street, have issued an illustrated catalogue of 160 pages, showing in great detail complete outfits for explorers, campers, prospectors and sportsmen. A diversity of goods are shown from Tents, Firearms, Ammunition, Fishing Tackle, Camp Furniture and Utensils, Clothing, Foot and Head Wear, &c., to portable houses, there being 11 columns of index. They make a specialty of fitting out scientific and exploring expeditions, whether operating in temperate, torrid or arctic zones, and are furnishing the equipment for the new Ziegler expedition, now being fitted out for the discovery of the North Pole.

J. FRIEDENSTEIN.

J. FRIEDENSTEIN, managing director of the South British Trading Company, 6 Victoria avenue, London, is visiting this country for the purpose of interviewing manufacturers whom they represent, and with a view also of making connections with a few additional houses manufacturing Hardware and related lines, for whom they will act as agents in the English market. Among houses they are now representing are Corbin Cabinet Lock Company, Bemis & Call Hardware & Tool Company, Diamond Saw & Stamping Works, Cincinnati Tool Company, National Sewing Machine Company, Union Drawn Steel Company and Griffin Mfg. Company. While the principal business of the company is the sale in the English markets of American products, they have during the present unusual conditions here been exporting to this country large quantities of Iron and Steel of English and Continental manufacture. Mr. Friedenstien will remain here a month or two, his address being care of Oliver Bros., 127 Duane street, New York.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, }
NORFOLK STREET, LONDON, W. C. }

The Week's Hardware Trade.

THE home trade this week, both in Hardware and Cutlery, has been dull both in the wholesale and retail departments. Although there is at the present moment fair employment in Birmingham and Wolverhampton, yet manufacturers are nervous and orders are not as plentiful, large or remunerative as could be desired. The sharp advance in Copper has led to a brisk demand for Copper Goods, but manufacturers distrust this advance and think that it is artificially maintained for stock exchange purposes. The Cycle trade is not quite so strong as it was a few weeks ago. Manufacturers are not in immediate want of orders, but there is a perceptible slackening of public demand. Dealers and retailers are not prepared at the moment to accept further deliveries. Tin Plate makers report favorably of the prospects of the Bonnet and Traveling Box branch. Garden Tool makers are busy on Rakes, Hoes and Spades. There is a good inquiry for Hose Fittings and Motor Car accessories are selling well.

In many branches of the Cutlery trade there are serious complaints of depression and of the way in which business has slowed down during the last few weeks. The improvement in January is attributed to the fact that distributors throughout the country were replenishing their stocks in anticipation of larger sales. The demand upon them has not come and they are again holding their hands. Some travelers who resumed their journeys at the usual period have already returned, not having done anything like sufficient trade to cover their expenses. Orders have been difficult to book, but to collect accounts has been next to impossible. With some foreign markets more is being done, but, taking the Cutlery trade all around, the reports this week are discouraging. Manufacturers have been keeping their people employed, but much of the work has gone into stock, and at many places there are more finished goods in the warehouses now than for some years. The advancing prices of all kinds of hafting and other material are helping to check business.

On overseas account there is not much to be said. Good shipments of galvanized and other iron are going to India and South Africa. Australia is taking a fair quantity of Wrought Iron Tubes and Fittings and Fencing Wire. With Egypt, Turkey and India business men report fair activity in Wrought Copper Sheets, Strip and other manufactures, but though yellow metal in considerable quantities is still going to India, the Chinese demand for this alloy has seriously fallen.

Going to the States.

J. Friedenstein, the managing director of the South British Trading Company, Limited, will shortly be in New York. The South British Trading Company are well known over here for their energetic methods in the sale of American goods. Their policy of full agency and prompt cash, coupled with the guarding of the interests of British jobbers, has now been proved to be a good one. Mr. Friedenstein has left for New York and at his arrival can be found at the office of Oliver Bros., 127 Duane street. He will be glad if any American manufacturers of Builders' Hardware, Small Tools, &c., who want to be represented in this country, will communicate with him at this address.

New Bedstead Manufacturers' Association.

An important event this week has been the practical formation of a new Bedstead association. The famous Bedstead Alliance died of disintegration and disloyalty in August, 1900. Since then the trade has been free and open, and the keenest competition has prevailed. It was expected that it would be so, because the alliance ended in a period of acute depression. Customers were overstocked and business was extremely difficult to obtain, and the result was a return to conditions which, in the opinion of some in the trade, were as bad as any experienced prior to the days of the alliance.

Small Arm Makers.

The Birmingham Small Arm manufacturers, being concerned as to the future of their trade, have got into communication with the Secretary of War, who in reply states that they are under a misapprehension in assuming that because the bulk of the discharges necessary to bring the arsenal into normal condition will not take place before April next, the Woolwich orders for the current financial year have been increased for the purpose of finding employment in the Royal Arsenal. As a matter of fact no additional orders have been given for a Small Arm Ammunition. The orders for 1903-4 have not yet been definitely settled, but, as far as can now be foreseen, the proportion of the total requirements to be ordered from the trade will be quite equal to that which has been allotted to them during the current year, although it will be quite anticipated that the quantity required has been reduced. In plain terms, the meaning of this intimation is that fewer Guns will be on order by the Government, and accordingly Gun makers will want to sell their Guns at a cheaper price than during the strenuous period covered by the war.

Agricultural Implements in Normandy.

As a general rule farmers of Normandy do not make much use of improved labor saving implements, but during the last few years there has been a distinct advance in this respect, especially in the large holdings, and agricultural implements are now classified at the Custom House among the principal imports of the port of Havre. Most of these implements are received from the United States, the quantity imported from the United Kingdom being comparatively small. There is a co-operative society at Amlens for purchasing from the makers and furnishing to agriculturists all kinds of labor saving appliances, and American manufacturers should not fail to get into touch with it.

Syria and the Eastern Mediterranean.

Last year I wrote at length on the prospects of trade in the Eastern Mediterranean. I have generally been alone in my belief that before long the Eastern littoral of the Mediterranean will again assume commercial importance. I am glad, therefore, to find that another writer, S. L. Bensusan, seems to be of my opinion. Writing of Syria, he tells us that while there is a moderate volume of traffic with half a dozen cities, in scores of towns there is not sufficient security to permit the proper development of commerce, and the natives reduce their wants to a minimum, and are content with difficult and sometimes dangerous journeys, taken at long intervals, to the nearest town that traffics with the West. Insecurity and lack of sanitary knowledge, coupled with an aversion for medical advice and assistance, and helped by the emigration that is in progress all the year, avail to keep the population stationary; fevers claim many victims, and ophthalmia plays havoc with the sight of young and old. Slowly the counteracting influences are at work, conquering native obstinacy and introducing a better organization. Already one finds the good work of school and hospital bearing fruit, the story of progress eagerly listened to, a new generation arising that is prepared to depart a little way, at least, from the old paths and to accept some of the wisdom of the West. If the progress is slow it is also sure, and with the development of the many political plans at present under discussion in the European chancelleries, the era of security will dawn, the population will respond to it, and the countless cities lying between Beirut and the Tigris and Euphrates will renew their youth and seek the manufactures of the West. The esteem in which the British merchant is held throughout Syria is a most hopeful augury of the future, and our commercial interests are in very strong hands.

I need only add that what S. L. Bensusan says about the British manufacturer is equally applicable to the American.

The Trade in India.

According to the Indian correspondent of the *Iron-monger*, the Commissioner-General to the East for the St. Louis Exhibition, who has recently finished a tour

through India, has stated in the course of an interview that if Indian brass and metal workers cared they might build up a big trade with the United States. He says that Americans at the Delhi Durbar have bought enormous quantities of this work, on which the duty in the States will probably be more than the original cost. The buyers, however, are of a class who do not mind the cost. They want it, and the question of rupees or dollars does not trouble them.

Trade Prospects in Jamaica.

Jamaica is quite near to the United States, but it is also, by reason of shipping facilities, very near to Great Britain. It is important, I think, that American exporters should watch the colony of Jamaica for two reasons: First, because Jamaica lies near to the United States, and second, because the United States buy more largely from them than they sell to Jamaica. In 1901 the United States sold to Jamaica goods to the value of £717,033, compared with £814,639 sold by Great Britain. But whereas Great Britain only bought from Jamaica to the extent of £338,977, the United States bought from Jamaica goods valued at £1,146,381. For six years Jamaica has been suffering from agricultural and commercial depression, and the public finances have been seriously embarrassed. There has been heavy retrenchment in public expenditure, while the failure of the Jamaica Railway Company and the provision of a subsidy of £20,000 to the shipping line have imposed heavy burdens on the Jamaica Treasury, which burdens had had to be borne by taxation at a time when the country was ill able to bear it. Two years ago there were symptoms of a general improvement. Since then these signs have multiplied, and at the present moment the exports of island produce show an increasing excess over imports. The revenue shows corresponding elasticity, and it may therefore be presumed that Jamaica will be paying off her debts. The point for American exporters to observe is that trade is greatly improved. Last year the imports of Jamaica reached £1,699,525, the exports for the same year being £1,939,142.

Iron and Steel Goods in Mexico.

Although Mexico is practically part of your continent, yet information is constantly coming here which may be of use to your readers, and I therefore transmit the latest news I have received from that country. The imports of iron and steel of all kinds and the manufactures thereof amounted to \$7,667,000, as against \$9,248,000 in 1900. The principal item was Steel Rails, which represent a value of \$2,383,000. Though the amount is rather less than last year it exceeds that of the previous one. So long as the extension of railways progresses Rails will have to be imported, as there are no steel works in the country, though there are several iron foundries which undertake all large kinds of work that do not require very great finish. Another of the principal items under the heading iron and steel, daily becoming of more general use, are Iron Beams. It is several years ago since they were first introduced into the country, and now they are employed in all the large buildings; the largest that has been begun in the city is that destined for the General Post Office. The whole of the structure is of iron, and is only faced with cut stone, and it is further claimed that with this construction it not only insures the building against fire, but that it will stand the shocks of earthquakes without showing any deterioration. The whole of the iron frame work for this building was imported from the United States, the iron parts proving more reasonable in price than what came from Belgium, the country which formerly supplied them.

The value of mining steel imported in 1901 was \$86,000, as against \$152,000 in 1900. Barbed Wire, which is now used very largely in the fencing of grazing lands, was imported in 1901 to the value of \$333,000, while in 1900 it was only \$289,000.

Corrugated Iron Sheets still show an increase in value, the imports in 1901 amounting to \$776,000, as against \$742,000 in the previous year. This increase is due to the more general use of this article in modern buildings, especially so in those having iron frames in which the

use of wood is practically confined to the finishings of windows and doors. Iron Beams and Corrugated Iron Sheets have replaced the old fashioned wooden beams and floors.

A slight increase is also noticeable in the imports of Agricultural Tools. In this branch of the imports Germany and the United States supply the greatest part, and the United States is first in nearly all the other branches, such as Rails, Wire, Iron Sheets, &c. The trade from the United Kingdom has decreased very considerably. This is partly accounted for by the fact that out of the five principal Iron and Hardware stores in this city four are German, and it is quite natural that they should give preference to their own manufactures, although they may not be of such good quality as those of British manufacture.

It is surprising that with the amount of building that is going on, not only in the city proper but throughout the whole of the country, it is very difficult to find a good quality of Bolts, Hinges and such articles for trimming houses nicely. This is certainly one of the greatest inconveniences that architects and tenants have to suffer, as whatever is put in the buildings is of such a character that it very soon gets out of order.

AUSTRALIAN LETTER.

FROM A SPECIAL CORRESPONDENT.

TRADE generally throughout the Commonwealth shows an unmistakable downward tendency. Customs revenues, railway receipts and commercial transactions have all shrunk in volume. Travelers have been called in from several districts, and one Victorian house have called in all their country travelers. Rumor has it that they have been badly "hit" through long credit to country customers. Meantime all we can do is to hustle through the bad times in the hope of good years to come.

American Methods of Warehouse Construction. are to form the subject of study for Guy Purchas, a well-known Melbourne architect, who leaves Australia on April 13 for New York. This gentleman is preparing plans for the new Melbourne warehouse of Briscoe & Co., Limited. This last named firm, who are without doubt the largest and most solid of Australian wholesale Hardware firms, having branches in various centers, recently purchased a block of land, 58 x 150 feet, in Little Collins St., Melbourne, nearly opposite their present premises. On it they intend to build an up to date five-story warehouse. It is a huge compliment to American methods and American organization when so eminently British a firm send their architect on so long and expensive a trip. The building is to be principally of steel and terra cotta, and thus practically fire proof. American exporters may also take note of Briscoe & Co.'s evident faith in the future of the Australian Hardware trade.

Farm Implements in New Zealand.

A recent cable announces the amalgamation of the various manufacturers of Farm Implements at Christchurch and Dunedin, with a paid up capital of nearly £200,000. This amalgamation will undoubtedly prove a strong factor in controlling local trade and local importations. At date of writing, particulars are not yet available in Australia.

ADVERTISING THE SALESMAN'S ALLY.

H. P. TOWNLEY, Terre Haute, Ind., is offering for sale to the retail trade collections of advertisements which have been used in his business and have won trade. The advertisements are "intended to catch the eye, interest the mind and reach the pocketbook." They are published in book form, each book relating to different lines as follows: Steel Ranges, Hardware, Warm Air Furnaces, Bicycles, Implements and Vehicles. Some of the advertisements are illustrated, while others of a more general character have blank spaces in which to insert cuts of the goods. Each book contains 50 advertisements, except the one relating to Steel Ranges, which contains 100.

PAY ROLL OF A. B. HENDRYX COMPANY.

WE give below a description of methods used by Andrew B. Hendryx Company, New Haven, Conn., for keeping account of the costs of goods which they

Report for the Head of the House.

In order that the labor costs and other details in regard to the operation of the factory may be brought to the direct attention of the head of the house each week

THE ANDREW B. HENDRYX CO.

Department C, No. 1

Pay-Roll for the Week ending September 13th 1902

This Sheet to due in office Monday, 8 A. M.

NAME.	No.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Satur.	No. of Hours.	Rate per Day.	Total Amount.
Real Work		2	2	1½	2	2	1			
Parrot		3	3	3½	3	3	3			

General		1	1	1	½	1	2			
Smith John (Foreman)	208	10	10	10	10	10	9	60	350	2100
Brazing cl. Rings		400	200	700	600			2,200	425	
" Solid "					7	13	15	35	350	
Soldering Screws		12						12	20	240
" Sp. Tensions			32					32	32	
Putting in Sp.			32					32	16	
Soldering Real Caps			2					2	4	30
Drilling for Caps			1½					1½	22	
Brown Chas	209	10	10	10	10	10	9	60	1115	3215

Fig. 1.—Showing the Arrangement of the Pay Roll.

manufacture, which include Bird Cages, Chain, Picture Cord, Fishing Reels, &c., in the production of which they employ 200 to 300 hands.

In order to keep a close track of the costs they have a system by which they ascertain each week

The Labor Cost

of each line of goods they manufacture, the figures being obtained from the pay roll. To effect this their system is as follows:

The foreman in charge of each department into which the factory is divided keeps track of the work done by the hands under him, and turns into the office his pay roll for the preceding week every Monday morning. These are then combined into the factory pay roll, the arrangement of which is shown in Fig. 1, which represents in reduced size a part of one of the sheets of the pay roll for Department C. By reference to this it will be seen that Charles Brown, for example, worked entirely on piece work, doing the various kinds of work specified, for which he is paid at different rates, the amount of pay he received during the week for each class of work being placed in the column "Rate Per Day." The items in this column are footed up and give the amount of his week's wages, \$11.15.

At the bottom of each of these pages in the pay roll the form indicated in Fig. 2 is stamped in the office with a rubber stamp, thus giving a list of the classes of goods manufactured among which wages are to be distributed. The pay roll is then gone over by a clerk, who figures up the amount earned by each employee, and on the blank form stamped at the foot of the pay roll he charges against each class of goods the cost of the labor expended on it. When the whole pay roll has been gone over in this way the total cost of labor by departments and of the different classes of goods is ascertained and charged against such goods.

a slip is made out in the form shown in Fig. 2, and is given to him or sent to him in case of absence. It will be noticed that on the upper part of this weekly report

Week ending Sept. 13, 1902.		
	Made-	Ordered-
Class A	1327	1662
Class B	3734	1395
Class C	328	511
Class D	61	39
Class E	2488	—
Class F	496	—
CLASS A 353 79 ^{ave.} .264		
CLASS B 366 64 .098		
CLASS C 225 01 .58		
CLASS D 154 93 .062		
CLASS F 50 76 .102		
CLASS G 444 54		
CLASS H 13 80		
CLASS I 162 18		
1714 65		

Employees 230
Hours 11891
" Ave .514
Pay " 740

Fig. 2.—Weekly Summary for the Head of the House.

a record is made of the number of finished articles made in each department during the week and also of the number ordered. In the lower left hand corner is a record of the amount of the pay roll for each class of goods, and on

the right the labor cost of each article is noted. This is obtained by dividing the total pay roll of the class by the number of goods completed in that class. This figure is found to vary materially from week to week, owing to the fact that goods of different grades are included under the same general heads, and also that the proportion of goods completed to the goods in process of manufacture varies considerably.

The report gives also the number of employees on the pay roll for the week, total number of working hours, the number of hours the average employee has worked and the average pay per employee. It will be seen that thus in condensed form the report gives valuable information which is of assistance in keeping track of factory costs and management, and also indicates something of the general condition of business.

HARDWARE FACTORY COSTS.

WE have received a number of letters from Hardware manufacturers in which they refer to the serious difficulties which lie in the way of an accurate knowledge of manufacturing costs in a line which is so diverse as Hardware, with its unequalled number of articles, most of which call for many operations in their production. For this reason, one of our correspondents points out, each manufacturer has to make a system for himself and adapt it to the special circumstances of his business, size of factory, class of product, &c. The need of information as to methods which are found satisfactory by those who have given careful attention to the subject is referred to by several of our correspondents, many of whom, though representing the best practice of the trade, express themselves as looking for suggestions with a view to improving their methods. The fact, too, that many manufacturers, especially those without long experience or suitable training, are content to rely largely on conjecture or an approximate estimate of cost, instead of having an adequate cost system, is alluded to by one of our correspondents.

The letter which we give below is from one of the most prominent Hardware manufacturers in the country. It will be found suggestive as explaining clearly and concisely the general outline of a cost system, and will doubtless be of service to many of our readers:

A Hardware Manufacturer's Cost System.

To the Editor:

A discussion of the question of factory cost should be of advantage, and we believe that were several manufacturers of Hardware to treat of the matter in the columns of your paper in a somewhat specific way, some of us might learn a new point or two, and general benefit result.

We shall add to what you have already said on the subject a few thoughts, just to help along the general discussion.

A COMPLEX SUBJECT.—The subject of Hardware manufacturing cost is interesting and complex. While it is possible as soon as experience gives the total of money expended in any given period to treat the matter as a whole, there are always elements of uncertainty surrounding any attempt to apply cost to particular lines of manufacture where more than one is carried on, or to particular jobs, or to product made between stock taking periods. For if the manufacturer knows the exact cost of labor and of all material actually used in the particular work, there still remain the large items of factory expense, such as superintendent, foreman, laborers, power, light, heat, supplies, &c., and all those other expenses which arise from the executive, clerical and selling departments and from taxes, insurance, bad debts and depreciation of plant.

PRODUCTIVE AND NONPRODUCTIVE LABOR.—The first thing to do is to take time in such a way as to divide labor into the two classes of producing and nonproducing. Producing labor is that labor which advances the condition of the work toward completion; and nonpro-

ducing labor is that which leaves the work just as it found it—as, for instance, the carrying of the work from one department to another. The question as to what is "completion" of the work might perhaps be raised. Many kinds of work after the processes of manufacture are completed, require to be prepared for the market by packing given quantities in boxes. Shall this be called producing or nonproducing labor? It is not of real consequence which it is called so long as the one who figures cost knows just which it is called in the taking of time.

THE ELEMENTS OF COST.—We now have as the basis of cost:

The cost of the material used.

The cost of producing labor in process work.

The cost of nonproducing labor in process work.

Both of these classes of labor should be taken by departments, or processes, where possible, so that experience will furnish figures which will give a percentage that the nonproducing bears to the producing in each process or department.

THE TOTAL COST.—The further labor cost which is found is in the various expense departments, such as superintendence, power, repairs, teams, yard, &c. To these labor charges must be added the other items of cost*, making the story about as follows:

1. Material used in the work.
2. Producing labor.
3. Nonproducing labor.
4. Expense departments' labor.
5. Supplies.
6. Executive expense.
7. Clerical expense.
8. General expense.
9. Traveling and selling.
10. Advertising.
11. Taxes and insurance.
12. Bad debts.
13. Depreciation of plant.

APPORTIONMENT OF EXPENSE.—These are all known items and offer no serious difficulty when applied to the entire product for any given period for which the accounts are made up by stock taking inventory, but when it is desired to find the cost of any given job the only known items are the material and the producing labor (the latter not always known in such cases, but sometimes estimated), the other items being a percentage to be added to the producing labor. And just here, aside from the uncertainties arising from changing costs on all these items, arises a broad field for difference of opinion in any given case. Especially is this so when the job does not go through all the processes which are required in the regular product, and for that reason the proper apportionment to "producing labor" of the other items of cost becomes a very nice question. We will not at this time discuss it, but would be very glad if others with experience in such matters would give us the benefit of their practice. In this way we may all of us derive some real advantage from the discussion.

PRICE-LISTS, CIRCULARS, &c.

LAMSON & GOODNOW MFG. COMPANY, Shelburne Falls, Mass., New York office, 45 Murray street, manufacturers of fine table and other Cutlery, have just issued an illustrated descriptive catalogue of their product. A wide assortment of this class of Cutlery is shown, including Carvers, Slicers, Table Knives and Forks, Molets, Carvers' Assistants, Cheese Knives, Pot Forks, Fruit, Orange, Pie and Butter Knives and Spreaders, Cheese Scoops, Bread, Kitchen, Butcher, Sticking, Skinning, Boning and Hunting Knives and many others for paper hangers, printers, one-arm men, together with Putty Knives, Scrapers and Spatulas in great variety.

CHAS. F. LORENZEN & Co., 279 North Ashland avenue, Chicago: Catalogue No. 42, illustrating a number of Grates, both open and closed, portable and stationary, together with sectional views showing damper arrangement, the fire place outfits being designed to accompany

* The concern which owes money finds an interest account in its expenditures, but we hardly think that it is the custom in making up cost, by those who have no debts, to allow for interest on cost of plant, &c., and for this reason we think this item should come out of the profits or add to the losses.

the artistic wood mantels manufactured by this company. Considerable space is also given to illustrations of Cast Brass and Wrought Iron Fire Place Goods, including Andirons and Fire Sets, Black Wrought Iron and Polished Brass Fenders, and Folding French Spark Screens, the latter being made in two general styles of heavy mattress woven cloth, manufactured in real brass or imitation; a number of Iron Fire Place Linings artistically designed, together with Gas Logs, Ash Pit Doors and Ash Traps.

BRIDGEPORT GUN IMPLEMENT COMPANY, 313-317 Broadway, New York: Retail catalogue of 90 pages, of Tennis and Golf Goods of every description, which also embraces the laws of lawn tennis and the way to mark out a court. Complete lines of goods and supplies for both games are illustrated and described.

E. J. MARTIN'S SONS, Rockville, Conn.: Illustrated catalogue of the Kingfisher brand of Braided Silk Fish Lines.

THE GENERAL FIREPROOFING COMPANY, Youngstown, Ohio: Allsteel Furniture and Filing Equipment, and Herringbone Expanded Steel Lath. Allsteel Furniture is shown in a catalogue, suitable for filing all classes of papers and cards, also bookcase units, tables, desks, wardrobes and library equipments.

N. & G. TAYLOR COMPANY, Philadelphia, Pa.: Pamphlet relating to the Taylor Paint, for use on Tin Roofs.

THE BAY STATE TAP & DIE COMPANY, Mansfield, Mass.: Catalogue illustrating Taps, Dies, Screw Plates, Tap and Drill Holders, &c.

THE NORWALK BRASS COMPANY, Norwalk, Conn.: Illustrated catalogue relating to Reversing Gear, Marine Hardware, Launch Fittings, Gas Engine Parts and Automobile Fittings. The company also make special castings for all purposes.

THE KEYSTONE STEEL MAT & MFG. COMPANY, Pittsburgh, Pa.: Catalogue devoted to Keystone Steel Matting, for use in doorways, vestibules, kitchens, laundries, schools, public buildings, hall, barrooms, lavatories, elevators, street and railway cars, steamships, ferries, &c.

THE CASE BROS. CUTLERY COMPANY, Little Valley, N. Y.: Tested XX Cutlery. An illustrated catalogue is devoted to Pocket Cutlery, Cotton Samplers', Pruning and Butcher Knives and Razors. The company guarantee every blade to be hand forged.

THE NIAGARA REFRIGERATOR WORKS, Buffalo, N. Y.: Catalogue relating to Erie and Niagara Refrigerators. Attention is called to the fact that the Erie line are now enameled, not only in the provision chamber, shelves, &c., but also in the ice chamber. It is remarked that these cost very little more than zinc lined Refrigerators.

THE JOHN C. JEWETT MFG. COMPANY, Buffalo, N. Y.: Catalogues illustrating Zinc, Glass and Tile Lined Refrigerators. Not having been in a position during the past year to fill orders as promptly as desirable, they have materially increased their capacity.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Catalogue and price-list illustrating Loaded and Empty Shot Gun Shells and kindred goods.

THE FARMERS' HANDY WAGON COMPANY, Saginaw, Mich.: Catalogue illustrating Handy Wagons, with both metal and solid wood wheels, with a variety of boxes, racks, &c. Log Trucks are also shown.

BUTLER BROS., Chicago: Catalogue No. 455, for spring 1903. This is the firm's "drummer," and contains 376 pages of illustrations and prices. The firm state that they have never sent out a catalogue that "so well deserved the close heed of buyers who know values when they see them." Recent large additions have been made to the firm's New York and St. Louis stores.

UNION BRICK BOND COMPANY, Pittsburgh, Pa.: Circular illustrating Corrugated Bonds for hollow brick walls, for veneering, facing old walls, &c.; also the Union Brick Handler, this being a clamp weighing 5 pounds, which holds ten bricks while hoisting them.

THE KINGERY MFG. COMPANY, Cincinnati, Ohio: Catalogue relating to Ice Cream Freezers, Packing Tubs and Cans, Ice Breakers and Shredders, Corn Poppers and Peanut Roasters, &c. The company manufacture Crystal Flake, designed for improving ice cream.

AMONG THE HARDWARE TRADE.

J. F. Dunham, dealer in Hardware, Stoves, Tinware, Sporting Goods and Harness, Adair, I. T., has lately moved into a new building.

Condit & Phillips, West Liberty, Iowa, have dissolved partnership. Z. T. Condit will continue under his own name.

C. C. Hoehne has succeeded E. B. Carpenter, at Greenwood, Wis., and has added largely to the stock acquired.

McDonald Bros. have disposed of their Hardware, Stove and Paint business in Madison, S. D., to E. L. Kingsley.

W. H. Palmer, Jr., has sold his Hardware, Agricultural Implement and Stove business in Buffalo Gap, S. D., to Bondurant & Phillips.

D. F. Bergler has bought a Hardware and Farm Implement store in Glasco, Kan.

The firm of Hayden & Reagan, Hardware merchants, Cassopolis, Mich., have been dissolved, Mr. Reagan retiring. The business will be continued by W. B. Hayden & Son.

Kee R. McKee, Cadiz, Ky., has disposed of his business to Terry, White & Co., who will continue at the old stand. The stock is an extensive one, comprising Hardware, Stoves, Agricultural Implements, Wagons and Buggies, Saddles and Harness, Paints, Oils, furniture, wall paper, groceries, &c.

H. D. Oaks, Hartford, S. D., has disposed of a half interest in his Hardware and machinery business to E. W. Rich, and the style has become Oaks & Rich.

A. B. Barber & Son, Eleventh and Spring Garden streets, Philadelphia, Pa., have added a line of Hardware in connection with their extensive Paint and decorating business.

W. H. Haney, Claremont, Va., has recently completed a new store, into which he has moved his stock of Hardware, Stoves, Farm and Garden Implements, Wagons, Harness, Lime and Cement, &c. The store is referred to by the local paper as having the first plate glass store front in the town. The building is 30 by 80 feet, two stories, with cellar full size.

Peterson & Raybourn, Madrid, Iowa, have disposed of their Hardware stock to W. H. Sutton & Co., of Westington Springs, S. D., to which place the goods have been removed.

Lyons Implement Company, Lyons, Kan., are putting in a stock of General Hardware.

J. N. Birbeck, Redlands, Cal., has removed his Hardware stock to new and larger quarters.

E. M. Richardson, Waltham, Mass., recently completed his thirty-second year in the Hardware business in that place. Mr. Richardson was with Eaton, Wellington & Co., Boston, from 1866 to 1871. In the latter year he engaged in business at Waltham, the style being Richardson Bros. In 1875 there was a change in the ownership, and for five years the business was carried on by Mr. Richardson and Joseph Bond, late president of the American Radiator Company. In 1880 Mr. Richardson became the sole owner, continuing until last year, when the style was changed to E. M. Richardson & Co., as at the present time.

On the first of March the Griffith Hardware Company of Rushville, Ill., celebrated the fiftieth anniversary of the entrance into the business of the senior partner, R. H. Griffith. His brother, T. D. Griffith, had opened a tin shop the previous summer and on the

first day of March, 1853, the two brothers formed a partnership under the name of Griffith & Brother. About the year of 1857 R. H. Griffith bought his brother's interest, and has continued the business up to this time, enlarging from time to time, as necessity demanded and capital allowed. In 1882 Mr. Griffith moved his old frame building to the rear and built a fine brick storehouse, 20½ feet wide and 120 feet long, fronting on the Public Square. A few years after he built a brick warehouse 40 feet front on Congress street and 80 feet deep. Last summer he tore away the wooden buildings on Congress street adjacent to the warehouse and filled the space between the warehouse and the rear of his front store with two handsome brick buildings, each 60 feet long and 28 feet wide, forming an ell and all communicating. In this large establishment an extensive stock of Hardware, Stoves, Farm Implements, Vehicles and Seeds is carried. On the first of March, 1883, Charles B. Griffith, the oldest son of Mr. Griffith, Sr., and the late Humphrey Griffith, his nephew and adopted son, who died about a month since, were admitted to partnership. The business of the firm has steadily increased, until last year it was by far the largest in their history. A year and a half ago Chas. Arthur Griffith, son of C. B. Griffith, took a clerkship in the establishment and has now taken the place of his uncle at the head of the Hardware department.

John Randolph, Keota, Iowa, has been succeeded in the Hardware and Stove business by H. C. Bower.

A. J. Swain has disposed of his entire interest in the Loree & Swain Hardware Company, Limited, Boise, Idaho, to W. R. Teller. The house has been reorganized under the style of Loree, Eastman & Teller Hardware Company, Limited, the capital stock being increased from \$42,000 to \$60,000. The new company will assume all liabilities and collect all accounts of the old concern.

The extensive business of L. W. Gunby, Salisbury, Md., has been incorporated under the style of the L. W. Gunby Company, the capital stock being \$150,000, all being subscribed and paid for in cash. The officers of the company are as follows: L. W. Gunby, president and general manager; Graham Gunby, vice-president; F. L. Smith, assistant to president; Edward C. Gunby, secretary; James T. Malone, assistant secretary, and Donald Graham, treasurer. In the formation of the company Mr. Gunby has recognized merit and business ability in the selection of his associates, all of whom have been identified with his business for many years. The company purpose to develop the wholesale department of the business, embracing General Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods, and will also make a specialty of all kinds of machinery, which are handled in connection with their machine shop and foundry. It has been decided to commence the erection of a new machine shop and foundry as soon as the weather permits, and to push it to completion as fast as possible. It will be fitted up with the latest improved machines and tools. On the second floor will be a large tin and sheet iron shop, pattern rooms, &c. Mr. Gunby started in business in 1872.

Sones Hardware & Furniture Company, Farmersville, Texas, have been incorporated with a capital stock of \$10,000. The company handle Hardware, Furniture, Saddles, Harness, &c.

Mattix, Turman & Riggs, Sullivan, Ind., have recently embarked in business, their line including Shelf and Heavy Hardware, Farming Implements, Vehicles, &c.

Newport Builders' Supply & Hardware Company, Newport, Ark., have been incorporated with a capital stock of \$40,000. The company will transact a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Mill Supplies, Building Materials, Lumber, Furniture, &c.

The Vogelsanger Hardware & Lumber Company, Cape Girardeau, Mo., have been organized with a capital stock of \$20,000. John F. Vogelsanger is president and treasurer. Sash, Doors and Finished Lumber have been added to the former lines.

William Lee's Hardware and Furniture store in McGregor, Texas, was robbed on the 5th ult., of 12 Revolvers, valued at \$125.

Alexander Grant's Sons, Syracuse, N. Y., have been incorporated and will continue the wholesale and retail business in Shelf Hardware, Stoves, Tinware, Sporting Goods, &c. The stock has been enlarged and the company are intending to give the jobbing end of the business more attention than heretofore.

The Clark Bloss Company, Dunkirk, N. Y., have been incorporated with a capital stock of \$25,000. The following are the directors of the concern: Clark Bloss, William Greer, B. N. Goodale, Flora B. Fetzner and C. D. Coyle. The company are successors to Clark Bloss, and will continue the retail Shelf and Heavy Hardware, Stove, Tinware and Agricultural Implement business.

Frank W. Dutton, Pittsfield, Mass., has disposed of his store to the Hardware & Mill Supply Company, Incorporated, who have removed the stock to 126 North street, where the business will be continued by the company as jobbers in Hardware, Chemicals, Mill Supplies, Paints, Oils, &c. James Kittle, for 20 years associated with Mr. Dutton and his predecessors, will be connected with the new corporation, filling the position of secretary. Wm. S. Smith is treasurer and manager.

The Leggett-Wisda Hardware Company, Ordway, Neb., have been organized. The new corporation have bought out the Beck Hardware Company and will continue the business at the old stand, which has been altered and attractively fitted up.

Comstock & Copeland are now comfortably settled in their fine new Hardware establishment at Noblesville, Ind.

L. W. Dietel has succeeded Chamuerlin & Dietel in the Hardware, Farm Machinery and Buggy and Wagon business in Hawkeye, Iowa.

MISCELLANEOUS NOTE.

Ottumwa Ball Bearing Sash Pulley.

The Johnston & Sharp Mfg. Company of Ottumwa, Iowa, makers of the Ottumwa ball bearing sash pulley, in order to provide for the demands of the trade are now making a type of their pulley with a longer face plate, and which has screw holes for fastening in. They report that the trade have taken up their specialty in a satisfactory manner and that business has been brisk.

Covert's Pri-mo Clasp.

Covert's Saddlery Works, Farmer, N. Y., are offering the clasp shown herewith. It consists of a formation of wire, in two parts, to make an automatic clasp fastening. It is made in sizes ¾ inch up to 2 inches, and



Covert's Pri-mo Clasp.

finished in nickel plate. It is designed more particularly for use on horse blankets and tent walls, but on account of its low cost and convenience, it is remarked, it may be used for many other purposes where a secure fastening is desired.

The Arctic Fruit Jar Wrench.

The accompanying cuts represent a fruit jar wrench put on the market by the Fanner Mfg. Company, Cleve-



Fig. 1.—The Arctic Fruit Jar Wrench.



Fig. 2.—The Arctic Wrench in Use.

land, Ohio. The wrench is made of wrought steel, nicely japanned. It is referred to as being a simple and perfect working wrench.

Stevens Model 1903 Single Shotguns.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., have recently put on the market the Stevens model 1903 single trigger action, single barrel shotgun, made in three styles, one of which, the No. 170, is here illustrated. This shotgun contains some novel features. It is described as without the top snap, the trigger serving to open the gun as well as discharge it. When the hammer is down pressure on the trigger pulls back the locking bolt and the gun is opened; the hammer being necessarily down to accomplish this. The cocking of the gun is independent. The solid locking bolt prevents the gun getting shaky, it is said, even with severe and long use. The hammer of this gun is so fitted in the frame that the working parts are thoroughly protected. The

rel, is choke bored for nitro powder, has pistol grip, walnut stock, rubber butt plate, drop forged frame, is case hardened and has patent forearm fitted with metal joint. It is made in 12 and 16 gauge, each 28, 30 and 32 inch barrels, and 20 gauge 26-28 inch barrels, the gun weighing 6½ to 6¾ pounds. No. 165, listed at \$9, is much the same as No. 160, with the addition of an automatic shell ejector. No. 170, as shown in the illustration, combines the various features of Nos. 160 and 165, with the addition of a checkered pistol grip and forearm and pistol grip cap, which greatly enhance the appearance of the gun. The same gauges, barrel lengths and weights apply, and it is listed at \$10.

The Savage Reloading Tool.

The Savage Arms Company, Utica, N. Y., are offering the reloading tool herewith illustrated. By the aid



Fig. 1.—The Savage Reloading Tool.

of the tool an exploded primer can be removed, the shell can be resized, the shell recapped and the cartridge loaded with powder and bullet. It is pointed out that



Fig. 2.—Enlarged View of the Shell Die.

the tool is complete in itself, and is adjustable without extra parts to remove an exploded primer, reduce the shell and to reload every cartridge for which it is made. It is stated that any variety of bullet may be used, and the bullet may be seated by the proper adjustment of



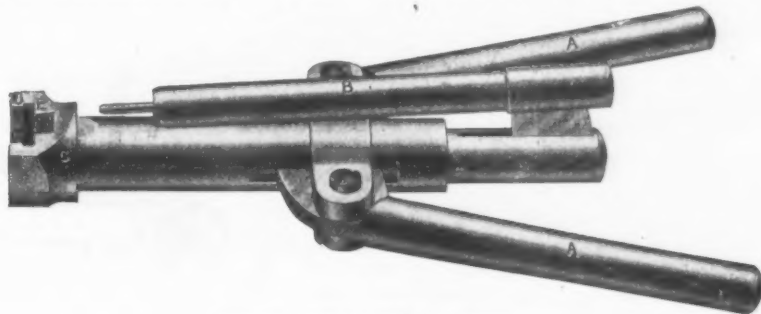
Stevens Model 1903 Single Trigger Action, Single Barrel Shotgun No. 170.

main spring and locking bolt spring are made of specially tempered coil spring wire. The guns are especially designed for smokeless powders, and all parts are interchangeable. The No. 160, listed at \$8, has trigger action, low rebounding hammer, special electro steel bar-

rel, is choke bored for nitro powder, has pistol grip, walnut stock, rubber butt plate, drop forged frame, is case hardened and has patent forearm fitted with metal joint. It is made in 12 and 16 gauge, each 28, 30 and 32 inch barrels, and 20 gauge 26-28 inch barrels, the gun weighing 6½ to 6¾ pounds. No. 165, listed at \$9, is much the same as No. 160, with the addition of an automatic shell ejector. No. 170, as shown in the illustration, combines the various features of Nos. 160 and 165, with the addition of a checkered pistol grip and forearm and pistol grip cap, which greatly enhance the appearance of the gun. The same gauges, barrel lengths and weights apply, and it is listed at \$10.

Stevens-Pope Re and De Capper.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., have recently put on the market the Stevens-Pope re and de capper as here illustrated. The standard calibers are now ready, and it will be made in all sizes. The body C is hollow and contains a plunger for seating primers and a spring for returning parts to initial position. To the rear end of this body are fulcrumed levers. A A, which engage the plunger. To the rear end of this plunger is hinged the expeller B. The forward part of the body has a slot, D, for receiving the

*Stevens-Pope Re and De Capper.*

head of shell for capping, and a slot, E, into which the primer is dropped, coming to exact position to enter primer pocket. In operation the implement is held in the palm of the hand with levers. A A wide open; the thumb is pressed on the rear end of expelling plug, B, lifting it so the shell is slid into it freely, the head of shell passing over shoulder. C. On removing the thumb the shell drops down so the head of shell falls behind shoulder C, which prevents shell shifting position when levers A A are closed, expelling old primer. The shell is then withdrawn and reversed with one motion, and head of shell dropped into slot D, a primer being then dropped into pocket E and levers are again closed, seating the primer. The tool is nicked, light, powerful and subject to slight wear.

Ossa Design.

The Russell & Erwin Mfg. Company, New Britain, Conn., and 43-47 Chambers street, New York, have recently put on the market the Ossa design, as here illus-

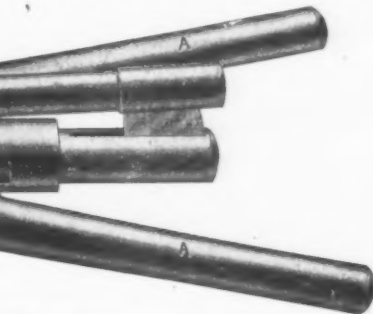
*Ossa Design Knob and Escutcheon.*

trated, in wrought bronze builders' hardware for lock sets in outside and inside trim. The style is Greek, the name recalling an historic mountain in Thessaly known in ancient geography and Grecian mythology. As is their custom the company issue for the trade a booklet

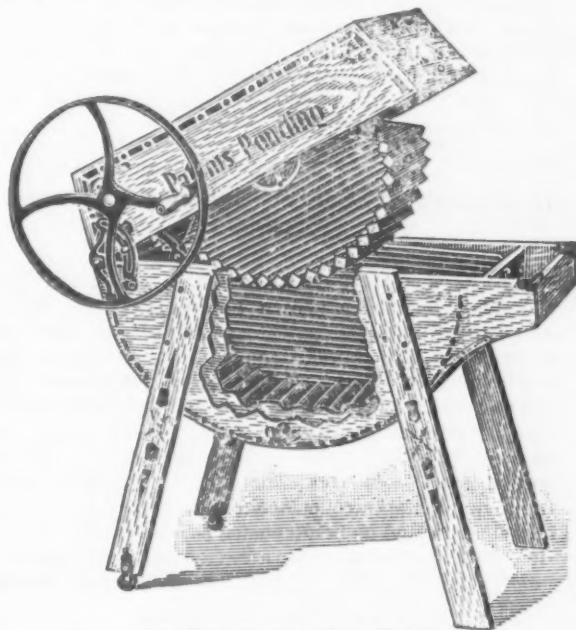
(on the illuminated cover of which is a picture of the famous mountain), illustrating the various knobs, escutcheons, push buttons, &c., of this design, and describing the many combinations for the different kinds of doors.

The Boss Internal Gear Washer.

The accompanying cut represents a washing machine which the Boss Washing Machine Company, Cincinnati, Ohio, have added to their line. One of the features of the washer is that the outer sides of the upper cylinder



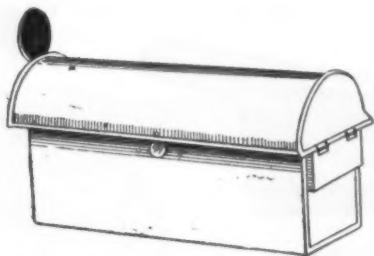
and the inner sides of the lower cylinder have deep corrugations in addition to corrugations on the lower sides of the half segments, making all four sides of the vibrating rubbers corrugated. There is a space of 1 1/2 inches on either side of the cylinders. This increase of space allows, it is remarked, an increase in capacity. It is pointed out that the increased rubbing surface with the additional space for capacity permits of increased agitation and thorough passing of water through the clothes, thereby cleansing clothes quickly and thoroughly. The lower cylinder, while detachable from the patent hook and journal bearings, will not

*The Boss Internal Gear Washer.*

float. It is made detachable for the purpose of quick adjustment, cleansing and drying the machine after use. The castings comprising the principle are all within the casing of the machine to protect them against breakage when shipping, &c. The castings underneath the cover are all heavily galvanized, and become self lubricating by coming in contact with the soap. This is referred to as an important feature, doing away with any possibility of grease spots getting on the garments. When operating, the wheel can be turned either to right or left, and can also be operated by power. It is stated that a child of 12 years can work the machine without fatigue. The entire body of the washer is constructed of Louisiana red cypress lumber in natural wood finish. The machine is made in three sizes, numbers 20, 21 and 22, the No. 20 being the one here described.

The Automatic Rural Free Delivery Mail Box.

The rural free delivery mail box shown herewith, which was approved by the Postmaster-General February 3, 1903, is offered by Charles W. Sayres, 20 East Princess street, York, Pa. The box is made of No. 20 gauge galvanized steel, and weighs 20 pounds. In manufacture the edges of the metal where they are joined are seamed, and also soldered on the inside of the box to make it doubly water proof and to give more strength. The mail is inserted through the opening in the end of



The Automatic Rural Free Delivery Mail Box.

the box, which is protected from the weather, and is large enough to admit of large periodicals or legal documents. The lock, which is on the front, is fastened on the inside of the box, and the key hole is protected from rain and sleet by a piece of metal, which works automatically in front of the keyhole to prevent the box freezing shut, which might occur if a padlock was used. The box is to be fastened to a post by three screws or nails. The name of the patron is designed to be stenciled on the front of the box, underneath the lock, where more protection is afforded the name, it is remarked, than when placed on the lid. The box is finished in aluminum bronze. When matter is deposited in the opening of the box for mailing, the signal should be raised, when it becomes automatically locked, and remains so until the carrier, wishing to remove the mail, unlocks the box with a key when the lid of the box raises and is held open by the aid of a spring inside the box until the mail is removed. The box is then locked by pushing the lid down to place.

The Savage 22 Caliber Hammerless Repeating Rifle.

The Savage Arms Company, Utica, N. Y., are offering the 22 caliber rifle shown herewith. The parts are drop forged and the barrel is of the best steel, made octagon only, the standard length being 24 inches. Stocks are pistol grip only. Two magazines are manufactured, one to take 22 short and the other to take 22 long and long rifle cartridges. The weight of the rifle is 5 pounds and 6 ounces. It is of the side ejector, take down type, hammerless, with solid top. The rifle is referred to as having a simple and strong mechanism with very few parts and springs, and as being positive in extraction and ejection. For gallery shooting an attendant may remove the empty magazine and quickly insert a loaded one with-



The Savage 22 Caliber Hammerless Repeating Rifle.

out taking the rifle from the shoulder of the shooter. It is pointed out that the cartridges in the magazine lie side by side, thus eliminating the possibility of one cartridge discharging another, and that a cartridge cannot be discharged until the action is closed and the entire mechanism is locked. The light weight and ease

of manipulation are referred to as making the rifle suitable for ladies' use, and owing to the extreme accuracy and rapid fire the rifle is especially adapted to snap and fancy shooting. For those who hunt a number of magazines loaded with the different 22 cartridges may be carried in the pocket without inconvenience and inserted instantly at will, thus insuring continuous fire.

The Irish Mail Children's Hand Car.

The Standard Mfg. Company, Anderson, Ind., are placing on the market a hand car for boys and girls, as shown herewith. The little vehicle is built broad and low



Fig. 1.—The Irish Mail Children's Hand Car.

to prevent liability of upsetting when making quick turns. It is also provided with rubber tires to make it noiseless, while the car is geared similar to a bicycle, to give greater speed than is ordinarily attained. An important feature, it is remarked, from a hygienic point

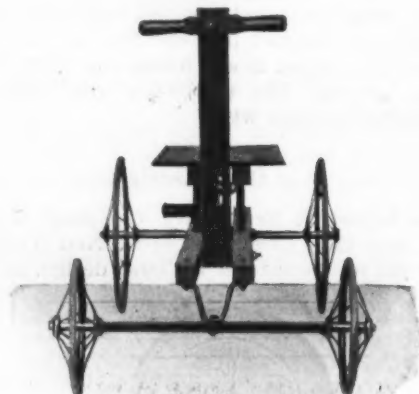


Fig. 2.—End View of Hand Car.

of view, which recommends it for children's use is that in operating it brings into play the muscles of the back, shoulders, chest and arms, and is steered by a gentle pressure of the feet. The car is provided with a seat

which will carry double, and a detachable lever is provided, to be quickly and easily applied. By this lever the energy of the second passenger can be utilized. The features combined make, it is explained, a very speedy and powerful hand car capable of uphill climbing without too great an expenditure of force.

Current Hardware Prices.

REVISED MARCH 31, 1903.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies that the

price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued April, 1902, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamsite in Carbons: Crystal..... \$ ton \$90@100
Grain..... \$ ton \$120@140

See also Emery.

Adjusters, Blind—

Domestic, \$ doz. \$3.00..... 33 1/2
North's..... 10%

Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent..... 25¢
Taplin's Perfection..... 25¢

Ammunition—See Caps, Cartridges, Shells, etc.

Anvils—American—

Armand Hammer, Wrought..... \$ 8 1/2 @ 9 1/2
Snel's Patent..... \$ 10 1/2 @ 11 1/2

Eagle Anvils..... \$ 7 1/2 @ 7 3/4
Hay-Budden, Wrought..... \$ 6 1/2 @ 6 3/4

Horseshoe brand, Wrought..... \$ 6 1/2 @ 6 3/4

Imported—

Peter Wright & Sons..... \$ 10 1/2 @ 11 1/2

Anvil, Vise and Drill—

Millers Falls Co., \$18.00..... 50¢10%

Apple Parers—See Parers, Apple, etc.

Aprons, Blacksmiths'—

Full Bros. Co.: Lots of 1 doz..... 25%
Smaller Lots..... 20%

Lots of 3 doz..... 30%

Augers and Bits—

Com. Double Spur..... 70¢10@75¢
Boring Machine Augers..... 10¢10@75¢

Car Bits, 12-in. twist..... 60¢60¢10%
Jennings' Pattern

Auger Bits..... 50¢10¢5@60¢

Ford's Auger and Car Bits..... 40%

Forster's Pat. Auger Bits..... 35%

C. E. Jennings & Co.: No. 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 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1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580, 1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632, 1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658, 1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710, 1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762, 1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788, 1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814, 1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866, 1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892, 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918, 1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944, 1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970, 1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048, 2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074, 2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100, 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126, 2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178, 2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230, 2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256, 2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282, 2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308, 2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360, 2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386, 2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438, 2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490, 2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516, 2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542, 2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568, 2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594, 2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620, 2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646, 2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672, 2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698, 2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724, 2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750, 2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776, 2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802, 2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828, 2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854, 2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880, 2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906, 2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932, 2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958, 2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984, 2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010, 3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036, 3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062, 3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088, 3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114, 3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140, 3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166, 3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192, 3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218, 3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244, 3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270, 3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296, 3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322, 3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348, 3350, 3352, 3354, 3356, 3358, 3360, 3362, 3364, 3366, 3368, 3370, 3372, 3374, 3376, 3378, 3380, 3382, 3384, 3386, 3388, 3390, 3392, 3394, 3396, 3398, 3400, 3402, 3404, 3406, 3408, 3410, 3412, 3414, 3416, 3418, 3420, 3422, 3424, 3426, 3428, 3430, 3432, 3434, 3436, 3438, 3440, 3442, 3444, 3446, 3448, 3450, 3452, 3454, 3456, 3458, 3460, 3462, 3464, 3466, 3468, 3470, 3472, 3474, 3476, 3478, 3480, 3482, 3484, 3486, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504, 3506, 3508, 3510, 3512, 3514, 3516, 3518, 3520, 3522, 3524, 3526, 3528, 3530, 3532, 3534, 3536, 3538, 3540, 3542, 3544, 3546, 3548, 3550,

Cartridges—

Blank Cartridges:	
38 C. F., \$5.60.....	10¢55
38 C. F., \$7.00.....	10¢55
32 cal. Rim., \$1.50.....	10¢55
32 cal. Rim., \$2.75.....	10¢55
B. B. Caps, Com. Ball Sngd.....	\$1.90
B. B. Caps, Round Ball.....	\$1.40
Central Fire.....	25¢
Target and Sporting Rifle.....	15¢10
Primed Shells and Bullets.....	15¢10
Rim Fire Sporting.....	50¢
Rim Fire Military.....	15¢55

Casters—

Bed.....	70¢70¢10¢
Plate.....	60¢60¢55¢
Philadelphia.....	75¢75¢10¢
Boss.....	70¢10¢
Boss Anti-Friction.....	70¢10¢
Martin's Patent (Phoenix).....	45¢
Standard Ball Bearing.....	45¢
Tucker's Patent low list.....	30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Jobbers' Shipments:	
3-16 1/4 5-16 3/4 7-16 1/2 9-16	
8-16 5-8 4-10 4-10 3-8 3-7 3-65	
3-6 3-4 3-4 1 to 1 1/4 inch.	
3-6 3-55 3-50 3-40 per 100 lb.	
German Coil.....	60¢10¢10¢

Halters and Ties—

Halter Chains.....	60¢10¢10¢10¢10¢
German Halter Chains, list July 26.	
97.....	60¢10¢10¢10¢10¢
Cow Ties.....	50¢10¢60¢

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair	
6-1/2-6-3, Straight, with ring.....	\$30.00
6-1/2-6-2, Straight, with ring.....	\$31.00
6-1/2-6-3, Straight, with ring.....	\$34.00
6-1/2-6-3, Straight, with ring.....	\$39.00
Add 2¢ per pair for Hooks.	
Twist Traces 2¢ per pair higher than	
Straight Link.	
Trace, Wagon and Fancy Chains.....	
50¢10¢50¢10¢10¢	

Miscellaneous—

Jack Chain, list July 10, '93:	
Iron.....	60¢10¢60¢10¢10¢
Brass.....	60¢10¢60¢10¢10¢
Safety Chain.....	70¢10¢75¢55¢
Gal. Pump Chain.....	lb. 60¢45¢
Covert Mfg. Co.....	40¢25¢
Breast.....	40¢25¢
Halter.....	40¢25¢
Heel.....	40¢25¢
Keel.....	40¢25¢
Stallion.....	40¢25¢
Covert Saddle Works.....	40¢25¢
Breast.....	70¢
Halter.....	70¢
Hold Back.....	70¢
Kelch.....	70¢
Oneida C. M. and Halters.....	40¢45¢55¢
Am. C. M. and Halters.....	45¢50¢55¢
Eureka Coll and Halters.....	45¢50¢55¢
Niagara Coll and Halters.....	45¢50¢55¢
Niagara Cow Ties.....	45¢50¢55¢
Wire Dog Chains.....	45¢50¢55¢
Dog Chain.....	70¢10¢
Universal Dbl-Jointed Chain.....	50¢

Chalk—(From Jobbers.)

Carpenters' Blue.....	gro. 10¢15¢
Carpenters' Red.....	gro. 85¢40¢
Carpenters' White.....	gro. 30¢35¢

Checks, Door—

Barclay's.....	40¢10¢
Columbia.....	50¢10¢
Eclipse.....	60¢

Chests, Tool—

American Tool Chest Co.:	
Boys' Chests, with Tools.....	55¢
Youths' Chests, with Tools.....	45¢
Gentlemen's Chests, with Tools.....	30¢
Farmers', Carpenters', etc., Chests,	
with Tools.....	20¢
Machinists' and Fip. Filters' Chests,	
Empty.....	50¢
C. E. Jennings & Co.'s Machinists' Tool	
Chests.....	33¢35¢10¢

Chisels—

Socket Framing and Firmer	
Standard List.....	70¢70¢10¢
Huck Bros.....	30¢
Charles Buck.....	30¢
C. E. Jennings & Co. Socket Firmer	
No. 10.....	60¢10¢
C. E. Jennings & Co. Socket Framing	
No. 15.....	60¢10¢
S. W. Nos. 7 to 12.....	70¢
L. & L. J. White.....	30¢30¢55¢

Tanged—

Tanged Firmers.....	40¢50¢40¢10¢
Huck Bros.....	30¢
Charles Buck.....	30¢
C. E. Jennings & Co. Nos. 191, 181.....	16¢10¢
L. & L. J. White, Tanged.....	35¢55¢

Cold—

Cold Chisels, good quality, lb. 13¢15¢	
Cold Chisels, fair quality, lb. 11¢13¢	
Cold Chisels, ordinary, lb. 8¢9¢	

Chucks—

Beach Pat., each \$8.00.....	35¢55¢
Pratt's Positive Drive.....	25¢
Empire.....	25¢
Blacksmiths.....	25¢
Skinner Patent Chucks:	
Combination Lathe Chucks.....	40¢
Drill Chucks, Patent and Standard.....	30¢
Drill Chucks, New Model.....	20¢
Independent Lathe Chucks.....	20¢
Improved Planer Chucks.....	25¢
Universal Lathe Chucks.....	40¢
Face Plate Jaws.....	40¢
Standard Tool Co.:	
Improved Drill Chuck.....	45¢
Union Mfg. Co.:	
Combination.....	40¢
3-4 Drill.....	30¢
Geared Scroll.....	30¢
Independent.....	40¢
Union Drill.....	30¢
Face Plate Jaws.....	30¢
Wescott Patent Chucks:	
Lathe Chucks.....	50¢

Little Giant Auxiliary Drill.....	40¢
Little Giant Double Grip Drill.....	40¢
Little Giant Drill, Improved.....	40¢
One-Drill.....	40¢
Scroll Combination Lathe.....	40¢

Clamps—

Adjustable, Hammers.....	20¢30¢55¢
Cabinet Sargent's, P. S. & W. Co.....	50¢10¢
Carriage Makers' Sargent's.....	60¢
Bevy, Parallel.....	35¢10¢
Lineman's, U. S. Dr. For Gr. & Tool Co.....	40¢
Saw Clamps, see Vices, Saw Mfrs.	

Cleaners, Drain—

Iwan's Champion, Adjustable.....	55¢
Iwan's Champion, Stationary.....	40¢

Sidewalk—

Star Socket, All Steel.....	70¢
Star Shank, All Steel.....	70¢
W. & C. Shank, All Steel, 7 1/2 in. 70¢	
\$3.05; 8 in. \$3.10; 8 1/2 in. \$3.25.	

Cleavers, Butchers—

Foster Bros.....	30¢
New Haven Edge Tool Co.....	45¢
Fayette R. Plumb.....	33¢35¢10¢
P. S. & W.....	50¢50¢55¢
L. & J. J. White.....	30¢

Clippers—

Chicago Flexible Shaft Company:	
94 Chicago Horse.....	\$8.75
1402 Chicago Horse.....	\$10.75
Lightning Belt.....	\$15.00
Chicago Belt.....	\$30.00
Stewart's Patent Sheep.....	\$18.50

Clips Axle—

Eagle and Superior 1/4 and 5-16	
inch.....	70¢10¢
Norway, 1/2 and 5-16 inch.....	70¢10¢

Cloth and Netting, Wire

See Wire, &c.

Cocks, Brass—

Hardware list:	
Compression and Plain Bibbs.....	55¢55¢60¢10¢
Globe, Kerosene, Racking, &c.....	65¢10¢70¢
Cocks.....	65¢10¢70¢

Coffee Dog—

Bratt, Walter B. Stevens & Son's list.	40¢
Embossed, Gilt, Walter B. Stevens &	
Son's list.....	30¢10¢
Leather, Walter B. Stevens & Son's list.	40¢

Combs, Mane and Tail—

Covert's Saddlery Works.....	40¢10¢
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Compasses Dividers, &c.—

Ordinary Goods.....	75¢75¢55¢
Bemis & Cail Hdwr. & Tool Co.:	
Dividers.....	65¢
Callipers, Call's Patent Inside.....	55¢
Callipers, Double.....	65¢
Callipers, Inside or Outside.....	65¢
Callipers, Wing.....	60¢
Compasses.....	50¢
J. Stevens & A. T. Co.....	25¢10¢

Compressors Corn Shock—

J. B. Hughes' 70 doz.....	\$2.50
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Conductor Pipe, Galva.—

L. C. L. to Dealers:	
Territory.....	Noted
Eastern.....	75¢75¢
Central.....	75¢75¢
Southern.....	70¢75¢
S. Western.....	65¢75¢10¢
Terms, 25¢ for cash. With delivery on	
fuel rates.	

Coolers, Water—

Gal. each.....	1 3 4 6 8
Labrador \$1.20 \$1.50 \$1.80 \$2.10 2.70	
Gal.....	2 3 4 6 8
Iceland, ea. \$1.80 \$2.10 \$2.40 \$3.00	
Gal.....	2 3 4 6 8
Galv. Lined Ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00	
Gal.....	2 3 4 6 8
Galv. Lined handles	
Gal.....	2 3 4 6 8
Each.....	\$1.95 \$2.15 \$2.40 \$3.20 \$4.15, 25¢

Coopers' Tools—

See Tools, Coopers'.	
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Cord—

Sash.....	lb. 25¢
Braided, Drab.....	lb. 25¢
Braided, White, Com.....	lb. 17¢40¢18¢
Cable Laid Italian, lb. A, 15¢; B, 16¢	
Common India.....	lb. 9¢45¢
Cotton Sash Cord, Twisted.....	lb. 12¢10¢
Patent Russia.....	lb. 12¢40¢13¢
Cable Laid Russia.....	lb. 12¢40¢13¢
India Hemp, Braided.....	lb. 14¢15¢
India Hemp, Twisted.....	lb. 10¢12¢
Patent India, Twisted.....	lb. 10¢12¢

Anniston Cordage Co.:

Old Glory, Nos. 7 to 12.....	70¢24¢
Anniston, Nos. 7 to 12.....	70¢24¢
Old Colour, Nos. 7 to 12.....	70¢24¢
Anniston Drab, Nos. 7 to 12.....	70¢24¢
Pearl Braided, cotton.....	70¢24¢

Massachusetts, White.....

Massachusetts, White.....	70¢24¢
Massachusetts, Drab.....	70¢24¢
Eddystone Braided Cotton.....	70¢24¢
Harmony Cable Laid Italian.....	70¢24¢

Crown, Solid Braided White.....

Crown, Solid Braided White.....	70¢24¢
Braided, Giant, White.....	70¢24¢
Peerless.....	70¢24¢

Cable Laid Italian.....

Cable Laid Italian.....	14¢
Cable Laid Russian.....	14¢
Braided India.....	12¢
Phoenix, White.....	18¢
Samson, Nos. 7 to 12.....	19¢

Silver Lake:

A quality, Drab, 40¢.....	15¢
A quality, White, 35¢.....	15¢
B quality, Drab, 35¢.....	15¢
B quality, White, 30¢.....	15¢
Italian Hemp, 40¢.....	15¢
Linen, 57¢.....	15¢

Wire, Picture—

List Oct. '00.....	85¢10¢85¢10¢55¢
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Crackers, Nut—

Grain.....	50¢
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Cradles—

White Round Crayons, gross 5¢40¢	
Cases, 100 gro., \$4.50, at factory.	

Cravens—

White Round Crayons, gross 5¢40¢	
Cases, 100 gro., \$4.50, at factory.	

Cravens—

White Round Crayons, gross 5¢40¢	
Cases, 100 gro., \$4.50, at factory.	

D. M. Steward Mfg. Co.	
Metal Workers' Crayons, gr. \$2.50	
Soapstone Pencils, round, flat	
or square.....	gr. \$1.50
Rolling Mill Crayons.....	gr. \$2.50
Railroad Crayons (compo-	
sition) gr. \$2.00	

See also Chalk.**Crooks, Shepherds—**

Fort Madison, Heavy.....	70¢
Fort Madison, Light.....	70¢

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden.....	50¢
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Cutlery Table—

Inter-mat Silver Company:	
No. 12 Medium Knives, 1847.....	70¢
Star, Eagle, Rogers & Hamilton and	
Anchor.....	70¢
Wm. Rogers & Son.....	70¢
Simion L. & Geo. H. Rogers Company:	
12 doz. Medium Knives.....	70¢
No. 77 Medium Knives.....	70¢

Cutters Glass—

H. A. New Co.....	40¢
Red Devil.....	50¢
Smith & Hemenway Co.....	50¢
Woodward.....	40¢

Meat and Food—

Hale's, Nos. 11 1/2 11 1/2 11 1/2 11 1/2	
Per doz.....	\$3.00 10.75 14.50
American.....	30¢
Nos.....	1 2 3 4
Each.....	\$5 \$7 \$10 \$25 \$50 \$80

Enterprise.....

Enterprise.....	5 10 12 23 32
Nos.....	3 2 3 2 5 4 5 3
Dixon's, 70 doz.....	30¢10¢40¢

Nos.....

Nos.....	1 2 3 4
\$14.00 \$17.00 \$19.00 \$30.00	
Home No. 1, 70 doz.....	50¢10¢
Little Giant, 70 doz.....	50¢10¢
Nos. 305 310 312 320 322	
\$35.00 \$45.00 \$44.00 \$72.00 \$68.00	

N. E. Food Choppers.....

Sterling.....	40¢40¢10¢
No.....	\$2.00 each No. 2 \$2.50 each
New Triumph No. 605, 70 doz.....	30¢10¢40¢

Woodruff's, 70 doz.....

Woodruff's, 70 doz.....	30¢10¢40¢
Nos.....	100 150
Enterprise Beef Shavers.....	\$15.00 \$18.00

Slaw and Kraut—

Henry Dison & Son.....	40¢
Slaw, Corn Grater, &c.....	40¢
Kraut Cutters 24 x 7, 20 x 8, 30 x 9, 55¢	
Kraut Cutters 36 x 12, 40 x 12.....	40¢
Sterling.....	30¢

Tucker & Dorsey Mfg. Co.:

Kraut Cutters.....	40¢
Slaw Cutters, 2 Knife, 70 gr.....	\$1.90 \$2.00
Slaw Cutters, 2 Knife, 70 gr.....	\$2.20 \$3.00

Tobacco—

All Iron, Cheap.....	70¢, \$1.25 to \$1.50
Enterprise.....	25¢50¢
National, 70 doz, No. 1, \$21; No. 2, \$18, 40¢	
Sargent's, 70 doz, No. 2.....	60¢
Sargent's No. 2 and 21.....	60¢10¢

Washer—

Appleton's, 70 doz.....	50¢10¢
Bouney's.....	40¢

Diggers, Post Hole, &c.—

Gates, Molasses and Oil-

Stebbins' Pattern... 80¢@90¢10¢

Gauges-

Marking, Mortise, &c... 50¢10¢50¢10¢10¢

Fulton's Butt Gauge... 30¢10¢

Stanley R. & L. Co.'s Butt & Babbit Gauge... 90¢20¢10¢10¢

Wire, Brown & Sharpe's... 35¢

Wire, Morse's... 35¢

Wire, P. S. & W. Co... 30¢10¢

Climets- Single Cut-

Nail, Metal, Assorted, gro. \$1.50@1.80

Spike, Metal, Assorted, gro. \$2.80@3.25

Nail, Wood Handled, Assorted, gro. \$1.75@2.00

Spike, Wood Handled, Assorted, gro. \$3.25@3.50

Glass American Window

Jobbers' List, Dec. 16, 1902.

From store, Single and Double 90¢10¢

F. O. B. factory, carload lots:

Single and Double... 50¢20¢2 1/2¢

2000 box lots... 90¢25¢

Glue-Liquid, Fish-

List A, Bottles or Cans, with Brush... 37 1/2¢50¢

List B, Cans (1/2 pts., pts., qts) 33 1/2¢48¢

List C, Cans (1/2 gal., gal.)... 25¢45¢

International Glue Co. (Martin's)... 40¢10¢50¢

Grease, Axle-

Common Grade... gro. \$5.00@6.00

Dixon's Everlasting... 10-lb pails, ea. 85¢

Dixon's Everlasting, in bxs., # doz. 1 lb \$1.20; 2 lb \$2.00

Griddles, Soapstone-

Pike Mfg. Co... 39¢@39 1/2¢10¢

Grindstones-

Bicycle Emery Grinder... \$8.50

Bicycle Grindstones, each... \$2.50@3.00

Pike Mfg. Co:

Improved Family Grindstones,

per inch, per doz... \$2.00 } 39¢

Pike Mower Knife and Tool

Grinder, each... \$0.00

Velox Ball Bearing, mounted, Angle

Iron Frames... each, \$3.25

Guards Snow-

Cleveland Wire Spring Co.:

Galv. Steel # 1000... \$9.00

Copper # 1000... \$18.00

Halters and Ties-

Covert Mfg. Co.:

Web... 45¢2¢

Jute Rope... 40¢5¢2¢

Sisal Rope... 20¢2¢

Covert's Saddlery:

Web and Leather Halters... 70¢

Jute and Manila Rope Halters... 70¢

Sisal Rope Halters... 70¢

Jute, Manila and Cotton Rope Ties... 70¢

Sisal Rope Ties... 70¢10¢

Hammers-

Handled Hammers-

Heller's Machinists'... 40¢10¢40¢10¢

Heller's Farriers'... 40¢10¢40¢10¢

Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50,

\$1.75... 40¢40¢10¢10¢

Peck, Stow & Wilcox... 50¢

Fayette R. Plumb... 40¢2¢@39 1/2¢10¢7 1/2¢

Engineers' and B. S. Hand... 50¢7 1/2¢50¢10¢7 1/2¢5¢

Machinists' Hammers... 50¢50¢10¢5¢

Riveting and Tinner's... 40¢2¢@40¢10¢2¢

Sargent's C. S. New List... 40¢

Heavy Hammers and

Sledges-

\$1b. and under... lb. 1/2c } 75¢5¢@75

Over 5 lb... lb. 30c } 40¢

Over 5 lb... lb. 30c } 40¢

Wilkinson's Smiths'... 9 1/2¢@10¢ lb.

Handles-

Agricultural Tool Handles-

Chicago Spring Butt Co.:

Friction... 25¢

Oscillating... 25¢

Big Twin... 25¢

Chisholm & Moore Mfg. Co.:

Baggage Car Door... 50¢

Elevator... 40¢

Railroad... 55¢

Cronk & Carrier Mfg. Co.:

100's Axle... 60¢

Roller Bearing... 60¢10¢

Lane Bros. Co.:

Parlor Ball Bearing... \$4.15

Parlor Standard... \$3.35

Parlor New Model... \$2.85

Parlor New Champion... \$2.25

Barn Door, Standard... 50¢10¢10¢5¢

Covered... 50¢10¢10¢5¢

Special... 50¢10¢10¢5¢

Lawrence Bros.:

Advance... 40¢

Cleveland... 60¢10¢

Crown... 60¢

Giant... 50¢10¢

New York... 60¢

Peerless... 60¢10¢

Steel... 60¢

Swine... 50¢10¢

Union, No. 44, \$5.00; No. 45 \$7.00;

No. 46, \$9.00.

McKinney Mfg. Co.:

No. 1, Special, \$15... 60¢10¢

No. 2, Standard, \$18... 60¢10¢

Hinckley House, \$1... 50¢

Meyers' stayon Hangers, 5¢10¢ (net)

C. S. Smith Mfg. Co.:

Lundy Parlor Door... 50¢10¢

Monarch Barn Door... 60¢10¢

Never Jam Hinge... 30¢10¢

Peerless... 60¢10¢

Perfection... 60¢10¢

Phoenix... 70¢5¢

Wagner's Adjustable... 70¢10¢

Warehouse Anti-Friction... 60¢

Richards Mfg. Co.:

Pioneer Wood Track No. 8... \$2.25

Imp'd Wood Track No. 9... \$2.25

Imp'd Steel Track No. 7... \$2.65

Imp'd Steel Track No. 9... \$2.50

Ball B'r'g Steel Track No. 10... \$2.50

Ball B'r'g Steel Track No. 11... \$2.45

Roller B'r'g Steel Track No. 12... \$2.40

Ball B'r'g Steel Track No. 13... \$1.75

Roller B'r'g Steel Track No. 14... \$2.65

Ball B'r'g Trolley Track No. 15... 40¢5¢

Ball B'r'g Trolley Track No. 19... 40¢5¢

Ball Bearing Tandem Trolley

Track No. 16... 40¢

Silent Adjustable Track No. 18... 40¢

Auto Adjustable Track No. 22... 40¢

Trolley B. D. No. 17... \$2.70

Trolley F. D. No. 120... \$2.70

Trolley F. D. No. 121... \$2.85

Trolley F. D. No. 151... \$3.00

Roller Bearing D. D. No. 25... 70¢5¢

Roller Bearing U. S. B. D... 70¢5¢

Anti Friction B. D... 60¢10¢

Ives' Wood Track No. 1... \$2.15

Imv. Imp'd Wood Track No. 2... \$2.15

Stowell Mfg. and Foundry Co.:

Acme Parlor Ball Bearing... 40¢

Atlas... 60¢

Badger Barn Door... 50¢

Baggage Car Door... 50¢

Chicago Anti-Friction... 40¢

Elevator... 40¢

North's Automatic Blind Fixtures, No.

2, for Wood, \$9.00; No. 3, for Brick,

\$11.50... 10¢

Parker... 70¢75¢

Reading's Gravity... 75¢10¢

Sargent's, Nos. 1, 3, 5, 11 & 13... 70¢10¢70¢20¢

Stanley's Steel Gravity Blind Hinges,

doz. sets, without screws, \$2.80

with screws, \$1.15.

Wrightsville Hardware Co.:

O. S. Lull & Porter... 7 & 35¢

Acme, Lull & Porter... 75¢

Queen City Reversible... 75¢

Stenger's Positive Locking, Nos. 1 &

3... 70¢10¢

Shepard's Noiseless, Nos. 60, 65, 55... 70¢10¢

Niagara Gravity Locking, Nos. 1, 3 &

1285, Old Pat'n, Nos. 1, 1 & 5... 75¢

Tip Pat'n, Nos. 1, 3 & 5... 75¢

Buffalo Gravity Locking, Nos. 1, 3 &

5... 75¢

Shepard's Double Locking, Nos. 30

& 25... 70¢

Champion Gravity Locking, No. 75... 75¢

Steamboat Gravity Locking, No. 10... 75¢

Pioneer, Nos. 60, 45 & 51¢... 75¢

Empire, Nos. 101 & 103... 70¢

W. H. Co.'s Mortise Gravity Locking,

No. 2... 60¢

Gate Hinges-

Clark's or Shepard's - Doz. sets:

No... 1 2 3

Hinges with Latches... \$2.00 2 1/2 5.00

Hinges only... \$1.50 2 0/5 3.90

Latches only... 70 70 35

New England:

With Latch... doz... \$2.50

Without Latch... doz... \$1.80

Reversible Self-Closing:

With Latch... doz... \$1.80

Without Latch... doz... \$1.45

Western:

With Latch... doz... \$1.80

Without Latch... doz... \$1.30

Wrightsville Hardware Co.:

Shepard's or Clark's, doz. sets,

No. 2 3

Hinges with Latches... \$2.00 2 1/2 5.00

Hinges only... 1.40 2 0/5 3.90

Latches only... 70 70 1.35

Spring Hinges-

Holdback, Cast Iron, gro. \$4.50@10 70

Non-Holdback, Cast Iron gro \$7@7.50

J. H. Barley:

Patent Cheeking... 15¢

Bommer Bros.:

Bommer Ball Ring Floor Hinges 40¢

Bommer Spring Hinges... 40¢

Chicago Spring Butt Co.:

Chicago Spring Hinges... 25¢

Triple End Spring Hinges... 50¢

Chicago (Ball Bearing) Floor

Hinges... 45¢

Garden City Engine House... 25¢

Keene's Saloon Door... 25¢

Columbian Hall, Co.:

Acme, Wrt. Steel... 30¢

Acme, Brass... 20¢ 1/2

Acme, Steel... 30¢

Columbia, No. 18... # gr. \$35.00

Columbia, Adjustable, No. 7... \$12.00

Gem, new list... 30¢

Clow's Leaf... # gr. \$12.50

Oxford, new list... 30¢

Hoffman Hinge & Foundry Co.

No. 70 & 90 Holdback Detachable \$9.50

Note.-Manufacturers and jobbers use

a diversity of lists, and often sell at net

prices.

Ft. Madison Cotton Hoe... 75¢7 1/2¢

Ft. Madison Crescent Cultivator Hoe,

per doz... 75¢10¢

Ft. Madison Mattock Hoes:

Regular Weight... # doz. \$5.00

Junior Size... # doz. \$4.00

Ft. Madison Sprouting Hoe, # doz. \$1 00

Ft. Madison Dixie Tobacco Hoe... 75¢20¢

Kretzinger's Cut Easy... 70¢10¢

Warren Hoe... 75¢15

W. & C. Ivanhoe... 75¢10¢2¢

B. B. Cultivator Hoe... 75¢10¢2¢

Acme Weeding... 75¢10¢2¢

W. & C. Lightning Shuffler Hoe, # doz.

\$4.50

Hoisting Apparatus-

See Machines, Hoisting.

Holders- Bit-

Angular, # doz. \$24.00... 45¢10¢

Iwan's Serrated..... doz. \$10.00
 Maine..... doz. \$8.50

Mincing—
 Buffalo..... doz. \$13.00

Miscellaneous—
 Farriers..... doz. \$2.00 to \$3.00
 Woonenholm's..... doz. \$3.00 to \$3.25

Knobs—
 Base, 2 1/2-inch, Birch, or Maple,
 Rubber tip, gro..... \$1.00 to \$1.20
 Carriage, Jap. all sizes..... doz. 25 to 50c
 Door, Mineral..... doz. 65 to 70c
 Door, Por. Jap'd..... doz. 70 to 75c
 Door, Por. Nickel..... doz. \$2.00 to \$2.15
 Bardale's Wood Door, Shutter, &c..... 15c
 Picture, Sargent's..... 60 to 100c

Lacing Leather—
 See Betting Leather—
Ladders Step Etc.—
 Laid in store..... 25c
 Myers Noiseless Store Ladders..... 30c

Ladies—Melting—
 L. & W. Co..... 25c
 P. S. & W..... 50c
 Reading..... 60c
 Sargent's..... 45 to 100c

Lanterns—Tubular—
 Regular Tubular No. 0, doz. \$4.35 to \$4.75
 Light Tubular, No. 0, doz. \$4.75 to \$5.25
 Hinge Tubular, No. 0, doz. \$4.75 to \$5.25
 Other Styles..... 50c to 1.00 to \$1.00 to \$1.50

Bull's Eye Police—
 No. 1, 2 1/2 inch..... \$2.50 to \$2.75
 No. 2, 3 inch..... \$2.75 to \$3.00

Latches—Gate—
 Hoffman's Safety Gate..... doz. 60c

Thumb—
 Roggin's Latches, with screw, doz. \$3.50 to \$4.00

Leaders—Cattle—
 Small..... doz. 55c; large, 60c
 Cover Mfg. Co..... 55c to 60c

Lifters, Transom—
 R. & E. Mfg. Co..... 33c to 35c

Lines—
 Wire Clothes, Nos. 15, 10, 20
 100 feet..... \$2.20 1.90 1.65
 75 feet..... \$1.80 1.70 1.30

Ossawa Mills—
 Crown Solid Braided Chalk..... 33c to 35c
 Mason's, No. 0 to No. 5..... 33c to 35c

Samson Cordage Works—
 Solid Braided Chalk, No. 0 to 3, 40c
 Silver Lake Braided Chalk, No. 0, 60c to 65c
 No. 1, 80c; No. 2, 70c; No. 3, 67c to 70c

Anniston Waterproof Clothes, 50 ft., 1/2 doz. \$22.00; 1/2 doz. \$20.00; Air Line \$20.00; Acme, \$15.00; Alabama, \$15.00; Empire, \$13.25; Advance, \$13.25; Allerton, \$11.50; Calhoun, \$10.00; Oriole, \$10.00; Albermarle, \$10.50; Eclipse, \$11.00; Chicago, \$10.00; Standard, \$9.00; Columbia, \$8.00.

Locks—Cabinet—
 Cabinet Locks..... 33c to 35c to 75c
 Door Locks, Latches, &c.—
 [Not prices are very often made on these goods.]

Reading Hardware Co..... 50c
 R. & E. Mfg. Co..... 40c
 Sargent & Co..... 40 to 40 to 10c

Elevator—
 Stowell's..... 40c

Padlocks—
 Wrought Iron..... 75c to 1.00 to 50c to 55c
 R. & E. Mfg. Co. Wrt. Steel and Brass..... 75c to 75c to 10c

Sash, &c.—
 Ives' Patent..... 55c to 75c
 Bronze and Brass..... 55c to 75c
 Crescent..... 50c
 Iron..... 60c to 75c
 Wrought Bronze and Brass..... 50c to 55c
 Wrought Steel..... 55c to 60c to 10c to 70c

Machines—Boring—
 Com., Upright, Without Augers..... \$2.00
 Com., Angular, Without Augers..... \$2.25

Without Augers—
 R. & E. Mfg. Co.: Upright, Angular
 Improved No. 3, \$4.25 No. 1, \$5.00
 Improved No. 4, \$7.75 No. 2, \$3.38
 Improved No. 5, 2.75

Jennings', No. 4, 1.15 No. 1, 3.50
 Miller's Falls..... 5.75
 Snell's, Rice's Pat. 2.50 2.75

Hoisting—
 Moore's Anti-Friction Differential Pulley Block..... 30c
 Moore's Hand Hoist, with Lock Brake..... 20c
 Moore's Portable Pneumatic Hoist..... 25c

Ice Cutting—
 Chandler's..... 15c to 10c

Washing—
 Boss Washing Machine Co.: Per doz.
 Boss No. 1, Boss Rotary..... \$57.00
 Boss No. 7, Dietz Rotary..... \$40.00
 Champion Rotary; Barnes No. 1..... \$45.00
 Standard Champion No. 1..... \$48.00
 Standard Perfection..... \$26.00
 Cinti Square Western..... \$30.00
 Union American, Round..... \$29.00

Mallets—
 Hickory..... 45c to 50c
 Lignumvitae..... 45c to 50c
 Tanners', Hickory and Applewood, doz..... 50 to 55c

Door—
 Elastic Steel (W. G. Co.)..... 10c

Mattocks—
 See Picks and Mattocks.

Menders Hose
 Robinson's Hose Menders..... doz. \$2.00

Milk Cans—See Cans. Milk
Mills—Coffee, etc.—
 Enterprise Mfg. Co..... 25c to 30c
 Hoffman's Side, Coffee and Spice..... 25c to 30c

National, list Jan. 1, '94..... doz. \$1.25
Parker's Columbia & Victoria..... 50c to 60c
Parker's Box and Side..... 50c to 60c
Swift, Lane Bros Co..... 30c

Mowers Lawn—
 Net prices are generally quoted.
 Cheap..... all sizes. \$1.50 to \$1.95
 Good..... all sizes. \$2.25 to \$2.50

10 12 14 16-inch
 4.25 4.50 4.75 5.00

Continental..... 60c to 10c
 Great American..... 2c
 Quaker City..... 2c
 Pennsylvania..... 2c
 Penn. & Va. Ball Bearing..... 60c to 5c
 Pennsylvania Golf..... 50c
 Pennsylvania Horse..... 45c
 Philadelphia..... 45c

Nails—
 Cut and Wire. See Trade Report.
 Wire Nails and Brads, Papered.
 List July 30, 1899..... 35c to 10c to 85c to 10c to 10c

Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—
 Nos. 6 7 8 9 10
 A. C..... 25c 23c 22c 21c 21c..... 40c to 5c
 Ausable..... 25c 24c 23c 22c 21c..... 50c to 10c
 C. B. K..... 25c 25c 22c 21c 21c..... 40c
 Champlin..... 25c 25c 22c 21c 21c..... 40c to 10c to 5c
 Clinton..... 19c 17c 16c 15c 14c to 10c to 5c
 Mauch..... 25c 23c 22c 21c 21c..... 50c
 Putnam..... 23c 21c 20c 19c 18c..... 33c to 5c

Putnam—
 Cold Roll'd 19c 18c 17c 16c..... 10c to 10c
 American, Nos. 5 to 10..... 10c to 10c
 Neponset..... Nos. 5 to 10..... 10c to 10c
 Jobbers' special brands, per lb. 8c to 9c

Picture—
 1 1/2 2 2 1/2 3 3 1/2 in.
 Brass Head..... 65 to 60 70 95 100 gro.
 Por. Head..... 1.10 1.10 1.10..... gro.
 Crown Picture Nails..... 2c to 1c

Nippers, See Pliers and Nippers.

Nuts—
 Cold Punched: Off list.
 Mfrs. or U. S. Standard..... \$1.50

Square, plain..... 12c to 12c
 Hexagon, plain..... 12c to 12c
 Square, C. T. & R..... 14c to 14c
 Hexagon, C. T. & R..... 15c to 15c

Hot Pressed:
 Mfrs. U. S. or Nar. Gauge Stan'd..... \$2.80
 Square Blank..... \$2.80
 Hexagon Blank..... \$2.80
 Square Tapped..... \$2.80
 Hexagon Tapped..... \$2.80

Oakum—
 Best or Government..... lb. 64c
 Navy..... lb. 49c
 U. S. Navy..... lb. 53c
 Plumbers' Spin Oakum..... 29c
 In carload lots 1/4 lb. off f.o.b. New York.

Oil Tanks—See Tanks, Oil.

Oilers—
 Brass and Copper..... 65c to 65c to 10c
 Tin or Steel..... 70c to 70c to 75c
 Zinc..... 75c to 75c to 10c

Cham. or Paragon:
 Brass and Copper..... 65c to 65c to 10c
 Tin or Steel..... 75c to 75c to 10c
 Zinc..... 75c to 75c to 10c

Malleable Hammers, Improved, No. 1 \$3.60; No. 2, \$4.00; No. 3, \$4.40; No. 4, \$4.80; No. 5, \$5.20; No. 6, \$5.60; No. 7, \$6.00; No. 8, \$6.40; No. 9, \$6.80; No. 10, \$7.20; No. 11, \$7.60; No. 12, \$8.00; No. 13, \$8.40; No. 14, \$8.80; No. 15, \$9.20; No. 16, \$9.60; No. 17, \$10.00; No. 18, \$10.40; No. 19, \$10.80; No. 20, \$11.20; No. 21, \$11.60; No. 22, \$12.00; No. 23, \$12.40; No. 24, \$12.80; No. 25, \$13.20; No. 26, \$13.60; No. 27, \$14.00; No. 28, \$14.40; No. 29, \$14.80; No. 30, \$15.20; No. 31, \$15.60; No. 32, \$16.00; No. 33, \$16.40; No. 34, \$16.80; No. 35, \$17.20; No. 36, \$17.60; No. 37, \$18.00; No. 38, \$18.40; No. 39, \$18.80; No. 40, \$19.20; No. 41, \$19.60; No. 42, \$20.00; No. 43, \$20.40; No. 44, \$20.80; No. 45, \$21.20; No. 46, \$21.60; No. 47, \$22.00; No. 48, \$22.40; No. 49, \$22.80; No. 50, \$23.20; No. 51, \$23.60; No. 52, \$24.00; No. 53, \$24.40; No. 54, \$24.80; No. 55, \$25.20; No. 56, \$25.60; No. 57, \$26.00; No. 58, \$26.40; No. 59, \$26.80; No. 60, \$27.20; No. 61, \$27.60; No. 62, \$28.00; No. 63, \$28.40; No. 64, \$28.80; No. 65, \$29.20; No. 66, \$29.60; No. 67, \$30.00; No. 68, \$30.40; No. 69, \$30.80; No. 70, \$31.20; No. 71, \$31.60; No. 72, \$32.00; No. 73, \$32.40; No. 74, \$32.80; No. 75, \$33.20; No. 76, \$33.60; No. 77, \$34.00; No. 78, \$34.40; No. 79, \$34.80; No. 80, \$35.20; No. 81, \$35.60; No. 82, \$36.00; No. 83, \$36.40; No. 84, \$36.80; No. 85, \$37.20; No. 86, \$37.60; No. 87, \$38.00; No. 88, \$38.40; No. 89, \$38.80; No. 90, \$39.20; No. 91, \$39.60; No. 92, \$40.00; No. 93, \$40.40; No. 94, \$40.80; No. 95, \$41.20; No. 96, \$41.60; No. 97, \$42.00; No. 98, \$42.40; No. 99, \$42.80; No. 100, \$43.20; No. 101, \$43.60; No. 102, \$44.00; No. 103, \$44.40; No. 104, \$44.80; No. 105, \$45.20; No. 106, \$45.60; No. 107, \$46.00; No. 108, \$46.40; No. 109, \$46.80; No. 110, \$47.20; No. 111, \$47.60; No. 112, \$48.00; No. 113, \$48.40; No. 114, \$48.80; No. 115, \$49.20; No. 116, \$49.60; No. 117, \$50.00; No. 118, \$50.40; No. 119, \$50.80; No. 120, \$51.20; No. 121, \$51.60; No. 122, \$52.00; No. 123, \$52.40; No. 124, \$52.80; No. 125, \$53.20; No. 126, \$53.60; No. 127, \$54.00; No. 128, \$54.40; No. 129, \$54.80; No. 130, \$55.20; No. 131, \$55.60; No. 132, \$56.00; No. 133, \$56.40; No. 134, \$56.80; No. 135, \$57.20; No. 136, \$57.60; No. 137, \$58.00; No. 138, \$58.40; No. 139, \$58.80; No. 140, \$59.20; No. 141, \$59.60; No. 142, \$60.00; No. 143, \$60.40; No. 144, \$60.80; No. 145, \$61.20; No. 146, \$61.60; No. 147, \$62.00; No. 148, \$62.40; No. 149, \$62.80; No. 150, \$63.20; No. 151, \$63.60; No. 152, \$64.00; No. 153, \$64.40; No. 154, \$64.80; No. 155, \$65.20; No. 156, \$65.60; No. 157, \$66.00; No. 158, \$66.40; No. 159, \$66.80; No. 160, \$67.20; No. 161, \$67.60; No. 162, \$68.00; No. 163, \$68.40; No. 164, \$68.80; No. 165, \$69.20; No. 166, \$69.60; No. 167, \$70.00; No. 168, \$70.40; No. 169, \$70.80; No. 170, \$71.20; No. 171, \$71.60; No. 172, \$72.00; No. 173, \$72.40; No. 174, \$72.80; No. 175, \$73.20; No. 176, \$73.60; No. 177, \$74.00; No. 178, \$74.40; No. 179, \$74.80; No. 180, \$75.20; No. 181, \$75.60; No. 182, \$76.00; No. 183, \$76.40; No. 184, \$76.80; No. 185, \$77.20; No. 186, \$77.60; No. 187, \$78.00; No. 188, \$78.40; No. 189, \$78.80; No. 190, \$79.20; No. 191, \$79.60; No. 192, \$80.00; No. 193, \$80.40; No. 194, \$80.80; No. 195, \$81.20; No. 196, \$81.60; No. 197, \$82.00; No. 198, \$82.40; No. 199, \$82.80; No. 200, \$83.20; No. 201, \$83.60; No. 202, \$84.00; No. 203, \$84.40; No. 204, \$84.80; No. 205, \$85.20; No. 206, \$85.60; No. 207, \$86.00; No. 208, \$86.40; No. 209, \$86.80; No. 210, \$87.20; No. 211, \$87.60; No. 212, \$88.00; No. 213, \$88.40; No. 214, \$88.80; No. 215, \$89.20; No. 216, \$89.60; No. 217, \$90.00; No. 218, \$90.40; No. 219, \$90.80; No. 220, \$91.20; No. 221, \$91.60; No. 222, \$92.00; No. 223, \$92.40; No. 224, \$92.80; No. 225, \$93.20; No. 226, \$93.60; No. 227, \$94.00; No. 228, \$94.40; No. 229, \$94.80; No. 230, \$95.20; No. 231, \$95.60; No. 232, \$96.00; No. 233, \$96.40; No. 234, \$96.80; No. 235, \$97.20; No. 236, \$97.60; No. 237, \$98.00; No. 238, \$98.40; No. 239, \$98.80; No. 240, \$99.20; No. 241, \$99.60; No. 242, \$100.00; No. 243, \$100.40; No. 244, \$100.80; No. 245, \$101.20; No. 246, \$101.60; No. 247, \$102.00; No. 248, \$102.40; No. 249, \$102.80; No. 250, \$103.20; No. 251, \$103.60; No. 252, \$104.00; No. 253, \$104.40; No. 254, \$104.80; No. 255, \$105.20; No. 256, \$105.60; No. 257, \$106.00; No. 258, \$106.40; No. 259, \$106.80; No. 260, \$107.20; No. 261, \$107.60; No. 262, \$108.00; No. 263, \$108.40; No. 264, \$108.80; No. 265, \$109.20; No. 266, \$109.60; No. 267, \$110.00; No. 268, \$110.40; No. 269, \$110.80; No. 270, \$111.20; No. 271, \$111.60; No. 272, \$112.00; No. 273, \$112.40; No. 274, \$112.80; No. 275, \$113.20; No. 276, \$113.60; No. 277, \$114.00; No. 278, \$114.40; No. 279, \$114.80; No. 280, \$115.20; No. 281, \$115.60; No. 282, \$116.00; No. 283, \$116.40; No. 284, \$116.80; No. 285, \$117.20; No. 286, \$117.60; No. 287, \$118.00; No. 288, \$118.40; No. 289, \$118.80; No. 290, \$119.20; No. 291, \$119.60; No. 292, \$120.00; No. 293, \$120.40; No. 294, \$120.80; No. 295, \$121.20; No. 296, \$121.60; No. 297, \$122.00; No. 298, \$122.40; No. 299, \$122.80; No. 300, \$123.20; No. 301, \$123.60; No. 302, \$124.00; No. 303, \$124.40; No. 304, \$124.80; No. 305, \$125.20; No. 306, \$125.60; No. 307, \$126.00; No. 308, \$126.40; No. 309, \$126.80; No. 310, \$127.20; No. 311, \$127.60; No. 312, \$128.00; No. 313, \$128.40; No. 314, \$128.80; No. 315, \$129.20; No. 316, \$129.60; No. 317, \$130.00; No. 318, \$130.40; No. 319, \$130.80; No. 320, \$131.20; No. 321, \$131.60; No. 322, \$132.00; No. 323, \$132.40; No. 324, \$132.80; No. 325, \$133.20; No. 326, \$133.60; No. 327, \$134.00; No. 328, \$134.40; No. 329, \$134.80; No. 330, \$135.20; No. 331, \$135.60; No. 332, \$136.00; No. 333, \$136.40; No. 334, \$136.80; No. 335, \$137.20; No. 336, \$137.60; No. 337, \$138.00; No. 338, \$138.40; No. 339, \$138.80; No. 340, \$139.20; No. 341, \$139.60; No. 342, \$140.00; No. 343, \$140.40; No. 344, \$140.80; No. 345, \$141.20; No. 346, \$141.60; No. 347, \$142.00; No. 348, \$142.40; No. 349, \$142.80; No. 350, \$143.20; No. 351, \$143.60; No. 352, \$144.00; No. 353, \$144.40; No. 354, \$144.80; No. 355, \$145.20; No. 356, \$145.60; No. 357, \$146.00; No. 358, \$146.40; No. 359, \$146.80; No. 360, \$147.20; No. 361, \$147.60; No. 362, \$148.00; No. 363, \$148.40; No. 364, \$148.80; No. 365, \$149.20; No. 366, \$149.60; No. 367, \$150.00; No. 368, \$150.40; No. 369, \$150.80; No. 370, \$151.20; No. 371, \$151.60; No. 372, \$152.00; No. 373, \$152.40; No. 374, \$152.80; No. 375, \$153.20; No. 376, \$153.60; No. 377, \$154.00; No. 378, \$154.40; No. 379, \$154.80; No. 380, \$155.20; No. 381, \$155.60; No. 382, \$156.00; No. 383, \$156.40; No. 384, \$156.80; No. 385, \$157.20; No. 386, \$157.60; No. 387, \$158.00; No. 388, \$158.40; No. 389, \$158.80; No. 390, \$159.20; No. 391, \$159.60; No. 392, \$160.00; No. 393, \$160.40; No. 394, \$160.80; No. 395, \$161.20; No. 396, \$161.60; No. 397, \$162.00; No. 398, \$162.40; No. 399, \$162.80; No. 400, \$163.20; No. 401, \$163.60; No. 402, \$164.00; No. 403, \$164.40; No. 404, \$164.80; No. 405, \$165.20; No. 406, \$165.60; No. 407, \$166.00; No. 408, \$166.40; No. 409, \$166.80; No. 410, \$167.20; No. 411, \$167.60; No. 412, \$168.00; No. 413, \$168.40; No. 414, \$168.80; No. 415, \$169.20; No. 416, \$169.60; No. 417, \$170.00; No. 418, \$170.40; No. 419, \$170.80; No. 420, \$171.20; No. 421, \$171.60; No. 422, \$172.00; No. 423, \$172.40; No. 424, \$172.80; No. 425, \$173.20; No. 426, \$173.60; No. 427, \$174.00; No. 428, \$174.40; No. 429, \$174.80; No. 430, \$175.20; No. 431, \$175.60; No. 432, \$176.00; No. 433, \$176.40; No. 434, \$176.80; No. 435, \$177.20; No. 436, \$177.60; No. 437, \$178.00; No. 438, \$178.40; No. 439, \$178.80; No. 440, \$179.20; No. 441, \$179.60; No. 442, \$180.00; No. 443, \$180.40; No. 444, \$180.80; No. 445, \$181.20; No. 446, \$181.60; No. 447, \$182.00; No. 448, \$182.40; No. 449, \$182.80; No. 450, \$183.20; No. 451, \$183.60; No. 452, \$184.00; No. 453, \$184.40; No. 454, \$184.80; No. 455, \$185.20; No. 456, \$185.60; No. 457, \$186.00; No. 458, \$186.40; No. 459, \$186.80; No. 460, \$187.20; No. 461, \$187.60; No. 462, \$188.00; No. 463, \$188.40; No. 464, \$188.80; No. 465, \$189.20; No. 466, \$189.60; No. 467, \$190.00; No. 468, \$190.40; No. 469, \$190.80; No. 470, \$191.20; No. 471, \$191.60; No. 472, \$192.00; No. 473, \$192.40; No. 474, \$192.80; No. 475, \$193.20; No. 476, \$193.60; No. 477, \$194.00; No. 478, \$194.40; No. 479, \$194.80; No. 480, \$195.20; No. 481, \$195.60; No. 482, \$196.00; No. 483, \$196.40; No. 484, \$196.80; No. 485, \$197.20; No. 486, \$197.60; No. 487, \$198.00; No. 488, \$198.40; No. 489, \$198.80; No. 490, \$199.20; No. 491, \$199.60; No. 492, \$200.00; No. 493, \$200.40; No. 494, \$200.80; No. 495, \$201.20; No. 496, \$201.60; No. 497, \$202.00; No. 498, \$202.40; No. 499, \$202.80; No. 500, \$203.20; No. 501, \$203.60; No. 502, \$204.00; No. 503, \$204.40

Pulleys—Single Wheel—

Inch.....	2	2 1/2	3
Awning, doz.	\$0.50	75	1.00
Hay Fork, Swivel or Solid Eye, doz.	4 in., \$0.95	5 in., \$1.25	
Inch.....	2	2 1/2	3
Hot House, doz.	\$0.60	80	1.10
Inch.....	1 1/4	1 1/2	2
Screw, doz.	\$0.14	17	20
Inch.....	1 1/4	2	2 1/2
Side, doz.	\$1.27	35	55
Inch.....	1 1/4	2	2 1/2
Tackle, doz.	\$0.27	37	50

Stowells:
Ceiling or End, Anti-Friction..... 00%
Dunlop, Walter, Anti-Friction, 4021 0%
Hay Fork, Anti-Friction, 5-in. Wheel, doz. \$12.00..... 50%
Electric Light..... 60%
Steel, Anti-Friction..... 60&10%

Sash Pulleys—

Common Frame: Square or Round
End, per doz., 1 1/2 in., 13c; 2 in., 16c
Auger Mortise, no Face Plate, per doz., 1 1/2 in., 12c; 2 in., 15c.
Auger Mortise, with Face Plate, per doz., 1 1/2 in., 13c; 2 in., 15c.
Acme..... 14 in., 16c; 2 in., 10%
Common Sense, 1 1/2 in., doz. 18c; 2 in., 20c.
For All-Steel, Nos. 3 and 7, 2 1/2 in., doz. 25c; No. 9, 1 1/2 in., doz. 20c
Extra for Plated Finish..... doz. 20c
Extra for Anti-Friction Bronze Bushing..... doz. 10c
Grand Rapids All-Steel Noiseless..... 40%
Ideal No. 13, 1 1/2 in., doz. 16c
Niagara..... 1 1/2 in., 16c; 2 in., 19c
No. 20, Troy..... 1 1/2 in., 14c; 2 in., 16c
Star..... 1 1/2 in., 16c; 2 in., 19c
Tackle Blocks—See Blocks.

Pumps—

Cistern..... 60&10%
Pitcher Spout..... 75&10%
Wool..... 75&10%
Pump Valves, Lower and Plunger Valves—Per Gro.:
Inch..... 2 1/4 2 1/2 2 3/4 3 1/4 3 1/2 4 1/4 4 1/2 5 1/4 5 1/2 6 1/4 6 1/2 7 1/4 7 1/2 8 1/4 8 1/2 9 1/4 9 1/2 10 1/4 10 1/2 11 1/4 11 1/2 12 1/4 12 1/2 13 1/4 13 1/2 14 1/4 14 1/2 15 1/4 15 1/2 16 1/4 16 1/2 17 1/4 17 1/2 18 1/4 18 1/2 19 1/4 19 1/2 20 1/4 20 1/2 21 1/4 21 1/2 22 1/4 22 1/2 23 1/4 23 1/2 24 1/4 24 1/2 25 1/4 25 1/2 26 1/4 26 1/2 27 1/4 27 1/2 28 1/4 28 1/2 29 1/4 29 1/2 30 1/4 30 1/2 31 1/4 31 1/2 32 1/4 32 1/2 33 1/4 33 1/2 34 1/4 34 1/2 35 1/4 35 1/2 36 1/4 36 1/2 37 1/4 37 1/2 38 1/4 38 1/2 39 1/4 39 1/2 40 1/4 40 1/2 41 1/4 41 1/2 42 1/4 42 1/2 43 1/4 43 1/2 44 1/4 44 1/2 45 1/4 45 1/2 46 1/4 46 1/2 47 1/4 47 1/2 48 1/4 48 1/2 49 1/4 49 1/2 50 1/4 50 1/2 51 1/4 51 1/2 52 1/4 52 1/2 53 1/4 53 1/2 54 1/4 54 1/2 55 1/4 55 1/2 56 1/4 56 1/2 57 1/4 57 1/2 58 1/4 58 1/2 59 1/4 59 1/2 60 1/4 60 1/2 61 1/4 61 1/2 62 1/4 62 1/2 63 1/4 63 1/2 64 1/4 64 1/2 65 1/4 65 1/2 66 1/4 66 1/2 67 1/4 67 1/2 68 1/4 68 1/2 69 1/4 69 1/2 70 1/4 70 1/2 71 1/4 71 1/2 72 1/4 72 1/2 73 1/4 73 1/2 74 1/4 74 1/2 75 1/4 75 1/2 76 1/4 76 1/2 77 1/4 77 1/2 78 1/4 78 1/2 79 1/4 79 1/2 80 1/4 80 1/2 81 1/4 81 1/2 82 1/4 82 1/2 83 1/4 83 1/2 84 1/4 84 1/2 85 1/4 85 1/2 86 1/4 86 1/2 87 1/4 87 1/2 88 1/4 88 1/2 89 1/4 89 1/2 90 1/4 90 1/2 91 1/4 91 1/2 92 1/4 92 1/2 93 1/4 93 1/2 94 1/4 94 1/2 95 1/4 95 1/2 96 1/4 96 1/2 97 1/4 97 1/2 98 1/4 98 1/2 99 1/4 99 1/2 100 1/4 100 1/2 101 1/4 101 1/2 102 1/4 102 1/2 103 1/4 103 1/2 104 1/4 104 1/2 105 1/4 105 1/2 106 1/4 106 1/2 107 1/4 107 1/2 108 1/4 108 1/2 109 1/4 109 1/2 110 1/4 110 1/2 111 1/4 111 1/2 112 1/4 112 1/2 113 1/4 113 1/2 114 1/4 114 1/2 115 1/4 115 1/2 116 1/4 116 1/2 117 1/4 117 1/2 118 1/4 118 1/2 119 1/4 119 1/2 120 1/4 120 1/2 121 1/4 121 1/2 122 1/4 122 1/2 123 1/4 123 1/2 124 1/4 124 1/2 125 1/4 125 1/2 126 1/4 126 1/2 127 1/4 127 1/2 128 1/4 128 1/2 129 1/4 129 1/2 130 1/4 130 1/2 131 1/4 131 1/2 132 1/4 132 1/2 133 1/4 133 1/2 134 1/4 134 1/2 135 1/4 135 1/2 136 1/4 136 1/2 137 1/4 137 1/2 138 1/4 138 1/2 139 1/4 139 1/2 140 1/4 140 1/2 141 1/4 141 1/2 142 1/4 142 1/2 143 1/4 143 1/2 144 1/4 144 1/2 145 1/4 145 1/2 146 1/4 146 1/2 147 1/4 147 1/2 148 1/4 148 1/2 149 1/4 149 1/2 150 1/4 150 1/2 151 1/4 151 1/2 152 1/4 152 1/2 153 1/4 153 1/2 154 1/4 154 1/2 155 1/4 155 1/2 156 1/4 156 1/2 157 1/4 157 1/2 158 1/4 158 1/2 159 1/4 159 1/2 160 1/4 160 1/2 161 1/4 161 1/2 162 1/4 162 1/2 163 1/4 163 1/2 164 1/4 164 1/2 165 1/4 165 1/2 166 1/4 166 1/2 167 1/4 167 1/2 168 1/4 168 1/2 169 1/4 169 1/2 170 1/4 170 1/2 171 1/4 171 1/2 172 1/4 172 1/2 173 1/4 173 1/2 174 1/4 174 1/2 175 1/4 175 1/2 176 1/4 176 1/2 177 1/4 177 1/2 178 1/4 178 1/2 179 1/4 179 1/2 180 1/4 180 1/2 181 1/4 181 1/2 182 1/4 182 1/2 183 1/4 183 1/2 184 1/4 184 1/2 185 1/4 185 1/2 186 1/4 186 1/2 187 1/4 187 1/2 188 1/4 188 1/2 189 1/4 189 1/2 190 1/4 190 1/2 191 1/4 191 1/2 192 1/4 192 1/2 193 1/4 193 1/2 194 1/4 194 1/2 195 1/4 195 1/2 196 1/4 196 1/2 197 1/4 197 1/2 198 1/4 198 1/2 199 1/4 199 1/2 200 1/4 200 1/2 201 1/4 201 1/2 202 1/4 202 1/2 203 1/4 203 1/2 204 1/4 204 1/2 205 1/4 205 1/2 206 1/4 206 1/2 207 1/4 207 1/2 208 1/4 208 1/2 209 1/4 209 1/2 210 1/4 210 1/2 211 1/4 211 1/2 212 1/4 212 1/2 213 1/4 213 1/2 214 1/4 214 1/2 215 1/4 215 1/2 216 1/4 216 1/2 217 1/4 217 1/2 218 1/4 218 1/2 219 1/4 219 1/2 220 1/4 220 1/2 221 1/4 221 1/2 222 1/4 222 1/2 223 1/4 223 1/2 224 1/4 224 1/2 225 1/4 225 1/2 226 1/4 226 1/2 227 1/4 227 1/2 228 1/4 228 1/2 229 1/4 229 1/2 230 1/4 230 1/2 231 1/4 231 1/2 232 1/4 232 1/2 233 1/4 233 1/2 234 1/4 234 1/2 235 1/4 235 1/2 236 1/4 236 1/2 237 1/4 237 1/2 238 1/4 238 1/2 239 1/4 239 1/2 240 1/4 240 1/2 241 1/4 241 1/2 242 1/4 242 1/2 243 1/4 243 1/2 244 1/4 244 1/2 245 1/4 245 1/2 246 1/4 246 1/2 247 1/4 247 1/2 248 1/4 248 1/2 249 1/4 249 1/2 250 1/4 250 1/2 251 1/4 251 1/2 252 1/4 252 1/2 253 1/4 253 1/2 254 1/4 254 1/2 255 1/4 255 1/2 256 1/4 256 1/2 257 1/4 257 1/2 258 1/4 258 1/2 259 1/4 259 1/2 260 1/4 260 1/2 261 1/4 261 1/2 262 1/4 262 1/2 263 1/4 263 1/2 264 1/4 264 1/2 265 1/4 265 1/2 266 1/4 266 1/2 267 1/4 267 1/2 268 1/4 268 1/2 269 1/4 269 1/2 270 1/4 270 1/2 271 1/4 271 1/2 272 1/4 272 1/2 273 1/4 273 1/2 274 1/4 274 1/2 275 1/4 275 1/2 276 1/4 276 1/2 277 1/4 277 1/2 278 1/4 278 1/2 279 1/4 279 1/2 280 1/4 280 1/2 281 1/4 281 1/2 282 1/4 282 1/2 283 1/4 283 1/2 284 1/4 284 1/2 285 1/4 285 1/2 286 1/4 286 1/2 287 1/4 287 1/2 288 1/4 288 1/2 289 1/4 289 1/2 290 1/4 290 1/2 291 1/4 291 1/2 292 1/4 292 1/2 293 1/4 293 1/2 294 1/4 294 1/2 295 1/4 295 1/2 296 1/4 296 1/2 297 1/4 297 1/2 298 1/4 298 1/2 299 1/4 299 1/2 300 1/4 300 1/2 301 1/4 301 1/2 302 1/4 302 1/2 303 1/4 303 1/2 304 1/4 304 1/2 305 1/4 305 1/2 306 1/4 306 1/2 307 1/4 307 1/2 308 1/4 308 1/2 309 1/4 309 1/2 310 1/4 310 1/2 311 1/4 311 1/2 312 1/4 312 1/2 313 1/4 313 1/2 314 1/4 314 1/2 315 1/4 315 1/2 316 1/4 316 1/2 317 1/4 317 1/2 318 1/4 318 1/2 319 1/4 319 1/2 320 1/4 320 1/2 321 1/4 321 1/2 322 1/4 322 1/2 323 1/4 323 1/2 324 1/4 324 1/2 325 1/4 325 1/2 326 1/4 326 1/2 327 1/4 327 1/2 328 1/4 328 1/2 329 1/4 329 1/2 330 1/4 330 1/2 331 1/4 331 1/2 332 1/4 332 1/2 333 1/4 333 1/2 334 1/4 334 1/2 335 1/4 335 1/2 336 1/4 336 1/2 337 1/4 337 1/2 338 1/4 338 1/2 339 1/4 339 1/2 340 1/4 340 1/2 341 1/4 341 1/2 342 1/4 342 1/2 343 1/4 343 1/2 344 1/4 344 1/2 345 1/4 345 1/2 346 1/4 346 1/2 347 1/4 347 1/2 348 1/4 348 1/2 349 1/4 349 1/2 350 1/4 350 1/2 351 1/4 351 1/2 352 1/4 352 1/2 353 1/4 353 1/2 354 1/4 354 1/2 355 1/4 355 1/2 356 1/4 356 1/2 357 1/4 357 1/2 358 1/4 358 1/2 359 1/4 359 1/2 360 1/4 360 1/2 361 1/4 361 1/2 362 1/4 362 1/2 363 1/4 363 1/2 364 1/4 364 1/2 365 1/4 365 1/2 366 1/4 366 1/2 367 1/4 367 1/2 368 1/4 368 1/2 369 1/4 369 1/2 370 1/4 370 1/2 371 1/4 371 1/2 372 1/4 372 1/2 373 1/4 373 1/2 374 1/4 374 1/2 375 1/4 375 1/2 376 1/4 376 1/2 377 1/4 377 1/2 378 1/4 378 1/2 379 1/4 379 1/2 380 1/4 380 1/2 381 1/4 381 1/2 382 1/4 382 1/2 383 1/4 383 1/2 384 1/4 384 1/2 385 1/4 385 1/2 386 1/4 386 1/2 387 1/4 387 1/2 388 1/4 388 1/2 389 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1/2 452 1/4 452 1/2 453 1/4 453 1/2 454 1/4 454 1/2 455 1/4 455 1/2 456 1/4 456 1/2 457 1/4 457 1/2 458 1/4 458 1/2 459 1/4 459 1/2 460 1/4 460 1/2 461 1/4 461 1/2 462 1/4 462 1/2 463 1/4 463 1/2 464 1/4 464 1/2 465 1/4 465 1/2 466 1/4 466 1/2 467 1/4 467 1/2 468 1/4 468 1/2 469 1/4 469 1/2 470 1/4 470 1/2 471 1/4 471 1/2 472 1/4 472 1/2 473 1/4 473 1/2 474 1/4 474 1/2 475 1/4 475 1/2 476 1/4 476 1/2 477 1/4 477 1/2 478 1/4 478 1/2 479 1/4 479 1/2 480 1/4 480 1/2 481 1/4 481 1/2 482 1/4 482 1/2 483 1/4 483 1/2 484 1/4 484 1/2 485 1/4 485 1/2 486 1/4 486 1/2 487 1/4 487 1/2 488 1/4 488 1/2 489 1/4 489 1/2 490 1/4 490 1/2 491 1/4 491 1/2 492 1/4 492 1/2 493 1/4 493 1/2 494 1/4 494 1/2 495 1/4 495 1/2 496 1/4 496 1/2 497 1/4 497 1/2 498 1/4 498 1/2 499 1/4 499 1/2 500 1/4 500 1/2 501 1/4 501 1/2 502 1/4 502 1/2 503 1/4 503 1/2 504 1/4 504 1/2 505 1/4 505 1/2 506 1/4 506 1/2 507 1/4 507 1/2 508 1/4 508 1/2 509 1/4 509 1/2 510 1/4 510 1/2 511 1/4 511 1/2 512 1/4 512 1/2 513 1/4 513 1/2 514 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1/2 577 1/4 577 1/2 578 1/4 578 1/2 579 1/4 579 1/2 580 1/4 580 1/2 581 1/4 581 1/2 582 1/4 582 1/2 583 1/4 583 1/2 584 1/4 584 1/2 585 1/4 585 1/2 586 1/4 586 1/2 587 1/4 587 1/2 588 1/4 588 1/2 589 1/4 589 1/2 590 1/4 590 1/2 591 1/4 591 1/2 592 1/4 592 1/2 593 1/4 593 1/2 594 1/4 594 1/2 595 1/4 595 1/2 596 1/4 596 1/2 597 1/4 597 1/2 598 1/4 598 1/2 599 1/4 599 1/2 600 1/4 600 1/2 601 1/4 601 1/2 602 1/4 602 1/2 603 1/4 603 1/2 604 1/4 604 1/2 605 1/4 605 1/2 606 1/4 606 1/2 607 1/4 607 1/2 608 1/4 608 1/2 609 1/4 609 1/2 610 1/4 610 1/2 611 1/4 611 1/2 612 1/4 612 1/2 613 1/4 613 1/2 614 1/4 614 1/2 615 1/4 615 1/2 616 1/4 616 1/2 617 1/4 617 1/2 618 1/4 618 1/2 619 1/4 619 1/2 620 1/4 620 1/2 621 1/4 621 1/2 622 1/4 622 1/2 623 1/4 623 1/2 624 1/4 624 1/2 625 1/4 625 1/2 626 1/4 626 1/2 627 1/4 627 1/2 628 1/4 628 1/2 629 1/4 629 1/2 630 1/4 630 1/2 631 1/4 631 1/2 632 1/4 632 1/2 633 1/4 633 1/2 634 1/4 634 1/2 635 1/4 635 1/2 636 1/4 636 1/2 637 1/4 637 1/2 638 1/4 638 1/2 639 1/4 639 1/2 640 1/4 640 1/2 641 1/4 641 1/2 642 1/4 642 1/2 643 1/4 643 1/2 644 1/4 644 1/2 645 1/4 645 1/2 646 1/4 646 1/2 647 1/4 647 1/2 648 1/4 648 1/2 649 1/4 649 1/2 650 1/4 650 1/2 651 1/4 651 1/2 652 1/4 652 1/2 653 1/4 653 1/2 654 1/4 654 1/2 655 1/4 655 1/2 656 1/4 656 1/2 657 1/4 657 1/2 658 1/4 658 1/2 659 1/4 659 1/2 660 1/4 660 1/2 661 1/4 661 1/2 662 1/4 662 1/2 663 1/4 663 1/2 664 1/4 664 1/2 665 1/4 665 1/2 666 1/4 666 1/2 667 1/4 667 1/2 668 1/4 668 1/2 669 1/4 669 1/2 670 1/4 670 1/2 671 1/4 671 1/2 672 1/4 672 1/2 673 1/4 673 1/2 674 1/4 674 1/2 675 1/4 675 1/2 676 1/4 676 1/2 677 1/4 677 1/2 678 1/4 678 1/2 679 1/4 679 1/2 680 1/4 680 1/2 681 1/4 681 1/2 682 1/4 682 1/2 683 1/4 683 1/2 684 1/4 684 1/2 685 1/4 685 1/2 686 1/4 686 1/2 687 1/4 687 1/2 688 1/4 688 1/2 689 1/4 689 1/2 690 1/4 690 1/2 691 1/4 691 1/2 692 1/4 692 1/2 693 1/4 693 1/2 694 1/4 694 1/2 695 1/4 695 1/2 696 1/4 696 1/2 697 1/4 697 1/2 698 1/4 698 1/2 699 1/4 699 1/2 700 1/4 700 1/2 701 1/4 701 1/2 702 1/4 702 1/2 703 1/4 703 1/2 704 1/4 704 1/2 705 1/4 705 1/

Sliding Shutter—
Reading list.....70¢10@75¢
R. & E. list.....33¢10¢
Sargent's list.....50¢10¢

Shells— Shells, Empty—
Brass Shells, Empty:
First quality, all gauges.....60¢25¢
Climax, Club, Rival, 10 and 12 gauge.....65¢5¢

Paper Shell, Empty:
Acme, Ideal, Leader, New Rapid,
Magic, 10, 12, 16 and 20 gauge.....25¢5¢
Blue Rival, New Climax, Challenge,
Monarch, Defiance, New Victor, Re-
peat r, Yellow Rival, 10, 12, 16 and
20 gauge.....40¢
Climax, Union, League, New Rival
10 and 12 gauge.....25¢
Climax, Union, League, New Rival
14, 16 and 20 gauge (27.50 list).....30¢
Expert, Metal Lined and Pigeon, 10,
12, 16 and 20 gauge.....33¢45¢
Robin Hood, Low Brass.....20¢10¢
Robin Hood, High Brass.....30¢10¢

Shells, Loaded—
Loaded with Black Powder.....40¢
Loaded with Smokeless Powder,
medium grade.....60¢5¢
Loaded with Smokeless Powder,
high grade.....40¢10¢10¢
Robin Hood, Low Brass.....50¢
Robin Hood, High Brass.....50¢10¢5¢

Shoes Horse, Mule, &c.—
F. o. b., Pittsburg:
Iron.....per keg \$3.85
Steel.....per keg 3.60
Burdens, all sizes, per keg.....\$3.90

Shot—
Drop, up to B, 25-lb. bag.....\$1.80
Drop, B and larger, per 25-lb. bag.....\$1.75
Buck, 25-lb. bag.....\$1.75
Chilled, 25-lb. bag.....\$1.75
Dust Shot, 25-lb. bag.....\$5.00

Shovels and Spades—
Association List, Nov. 15, 1902.....40¢

Sieves and Sifters—
Hunter's Imitation, gro. \$11.00@11.50
Buffalo Metallic Blue, S. & S. Co., per gr.:
14&16 10&18 18&20
\$12.00 \$13.80 \$15.00

National Mfg. Co.:
Victor.....per gro. \$12.00
Surprise.....per gro. \$11.00
No Name.....per gro. \$11.00
Shaker (Barley's Pat.) Flour Sifters.....
per doz., \$3.00.....30¢

Sieves, Tin Rim—
Per dozen:
Mesh.....14 16 18 20
Black, full size.....\$1.00 1.25 1.30 1.35
Plated, full size.....\$1.30 1.35 1.40 1.45
Black, scant.....\$0.75 1.00 1.05

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....\$0.65@0.75
Mesh 20, Nested, doz.....75¢ .85
Mesh 24, Nested, doz.....90¢1.00

Sinks—
Cast Iron—
Standard list.....60¢@70¢10¢
NOTE.—There is not entire uniformity
list used by jobbers.

Skins Wagon—
Cast Iron.....70¢@70¢10¢
Malleable Iron.....40¢10¢50¢
Steel.....40¢10¢10¢

Slates, School—
Factory Shipments.
"D" Slates.....45¢
Noiseless Slates.....60¢4 tens &c.
Wire Bound.....40¢

Slaw Cutters—See Cutters.
Slicers, Vegetable—
Sterling No. 10, \$2.00.....83¢

Snares, Harness—
German.....40¢@40¢10¢
Covert Mfg. Co.:
Derby.....30¢5&2¢
High Grade.....45¢
Jockey.....30¢10¢
Trojan.....45¢
Yankee.....30¢5&2¢
Yankee, Roller.....30¢5&2¢

Covert's Saddlery Works:
Crown.....60¢
German.....60¢
Model.....60¢
Triumph.....60¢
Onida Community:
Solid Steel.....60¢5¢
Solid Steel.....60¢
Sargent's Patent Guarded.....60¢5¢10¢

Snaths—
Scythe.....60¢@50¢10¢

Snips, Tinners'—See Shears.
Spoons and Forks—
Silver Plated—
Good Quality.....50¢10¢@60¢10¢5¢
Cheap.....60¢@50¢10¢
International Silver Co.,
1847 Rogers Bros. and Rogers & Ham-
ilton.....40¢10¢
Rogers & Bro., William Rogers Eagle
Brand.....50¢10¢
Anchor, Rogers Brand.....60¢
Wm. Rogers & Son.....60¢10¢
Simcox L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60¢
No. 77 Silver Plated Ware.....60¢10¢

Miscellaneous—
German Silver.....60¢@60¢10¢
Cataraugus Cutlery Co.:
Yukon Silver.....50¢
Simcox L. & Geo. H. Rogers Co.:
German or Nickel silver, special list
1 & 10¢

Tinned Iron—
Teas.....per gro. 45¢5¢
Tables.....per gro. 90¢10¢

Springs— Door—
Gonn (Coll.).....20¢
Star (Coll.).....30¢
Torrey's Rod, 39 in.....\$0.11
Victor (Coll.).....50¢10¢10¢

Carriage, Wagon, &c.
14 in. and Wider:
Black or 1/4 Bright, lb.....54¢
Bright, lb.....54¢
Painted Seat Springs:
1 1/2 x 2 1/2, per pr.....50¢55¢
1 1/2 x 2 1/2, per pr.....60¢65¢
1 1/2 x 3 x 28 and narrower, per pr.
80¢85¢

Sprinklers, Lawn—
Enterprise.....25¢30¢
Macksey.....\$0.20
Philadelphia No. 1, per doz. \$12; No. 2,
\$15; No. 3, \$24.....30¢

Squares—
Nickel plated.....List Jan. 5, 1900.
Steel and Iron.....70¢10¢
Rosewood Hat Try Square and T-
Bevels.....60¢10¢10¢70¢
Iron Hdl. Try Square and T-Bevels.....
10¢10¢10¢10¢
Diston's Try Sq. and T-Bevels.....70¢
Winterbottom's Try and Miter.....
40¢10¢40¢10¢10¢

Squeezers— Lemon—
Wood, Common, gro. No. 0, \$5.25
@ \$5.50; No. 1, \$6.25@ \$6.50.
Wood, Porcelain Lined.....
Cheap.....doz. \$2.00@2.75
Good Grade.....doz. \$3.00@3.50
Tinned Iron.....doz. \$0.75@1.25
Iron, Porcelain Lined doz. \$2.90@3.25

Staples—
Barbed Blind.....lb. 6¢@6¢
Electricians', Association list.....
80¢10¢10¢10¢
Fence Staples, See Trade Report.
Galvanized, 10c less than Barb Wire.
Polished, 50c less than Barb Wire.
Poultry Netting, Staples.....per lb.
34¢@5¢
Grand Crossing Tack Co.'s list.....80¢10¢

Steels, Butchers'—
Dick's.....30¢
Foster Bros.....30¢
Hartzell Cutlery Co.....30¢5¢
C. & A. Hoffmann's.....40¢

Steelyards.....25¢10¢30¢10¢
Stocks and Dies—
Blacksmiths.....40¢10¢50¢
Curly Reversible Ratchet Die Stock, 25¢
Gardner Die Stocks No. 1.....25¢
Gardner Die Stocks, larger sizes.....40¢
Green River.....25¢
Lightning Screw Plate.....25¢
Little Giant.....25¢
Rene's New Screw Plates.....25¢30¢

Stone—
Scythe Stones—
Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 inch, \$3.00 per
gro., 12 inch, \$10.00
Pike Mfg. Co. 1901 list:
Black Diamond S. S.....per gro. \$12.00
Lamotte S. S.....per gro. \$11.00
White Mountain S. S.....per gro. \$9.00
Green Mountain S. S.....per gro. \$8.00
Extra Indian Pond S. S.....per gro. \$7.50
No. 1 Indian Pond S. S.....per gro. \$7.00
No. 2 Indian Pond S. S.....per gro. \$6.50
Leader Red End S. S.....per gro. \$4.50
Balance of 1901 list 38¢5¢

Oil Stones, &c.
Chicago Wheel & Mfg. Co. 1901 list:
Gem Corundum Oil, Double Grit.....50¢
Gem Corundum Oil, Single or Double
Grit.....35¢
Gem Corundum Slips.....35¢
Gem Corundum Razor Hones.....50¢
Pike Mfg. Co. 1901 list:
Arkansas Stone, No. 1, 3 to 5 1/4 in. \$2.50
Arkansas Stone, No. 1, 5 to 8 in. \$3.50
Arkansas Slips No. 1.....\$4.00
Lily White Washita 4 to 8 in.....60¢
Rory Red Washita 4 to 8 in.....60¢
Washita Stone, Extra, 4 to 8 in.....50¢
Washita Stone, No. 1, 4 to 8 in.....40¢
Washita Stone, No. 2, 4 to 8 in.....30¢
Lily White Slips.....90¢
Washita Slips.....90¢
Washita Slips, Extra.....70¢
India Oil Stones (entire list).....34¢4¢
Hindostan No. 1, Regular.....\$0.10
Hindostan No. 1, Small.....\$0.10
Axe Stones (all kinds).....\$0.10
Turkey Oil Stones, ex. 5 to 8 in.....\$0.10
Queer Creek Stones, 4 to 8 in.....20¢
Sand Stone.....5¢
Belgian, German and Swaty Razor
Hones.....30¢
Natural Grit Carving Knife Hones.....
per doz. \$3.00
Quick Edge Pocket Knife Hones.....
per doz. \$3.00
Mounted Kitchen Sand Stone.....
doz. \$1.50

Stoners— Cherry—
Enterprise.....25¢30¢

Stops Bench—
Mills Falls.....15¢10¢
Morrill's.....\$0.20 No. 1, \$10.00.....50¢
Morrill's, No. 2, \$12.50.....50¢

Straps— Box—
Cary's Universal, case lots.....20¢10¢

Hame—
Covert's Saddlery Works.....60¢10¢
Stretchers, Carpet—
Cast Iron, Steel Points.....doz. 55¢60¢
Socket.....doz. \$1.75

Stuffers Sausage—
Enterprise Mfg. Co.....25¢25¢7 1/2¢
National Specialty Mfg. Co., list Jan.
1, 1903.....30¢

Supports, Porch—
Hoffman's Porch Supports.....doz. 25¢

Sweepers, Carpet—
National Sweeper Co.:
Marion, Roller Bearing, regular
brushes, full Nickel.....\$24.00
Marion Queen, Roller Bearing,
Fancy Veneers, full Nickel.....\$27.00
Monarch, Roller Bearing, Nickel.....\$22.00
Monarch, Roller Bearing, Jap. need.....\$21.00
Marion Queen, Roller Bearing, Reg-
ular Finishes, full Nickel.....\$24.00
Transparent, Roller Bearing, Plate
Glass Top, Nickel.....\$32.00
Monarch Extra, Roller Bearing,
(17-inch case), Nickel.....\$36.00
Monarch Extra, Roller Bearing (17-
inch case), Japaned.....\$33.00
Perpetual, Regular Bearings, Nickel.....\$20.00
Perpetual, Regular Bearings, Jan. \$14.00
NOTE.—Discount of 30c per dozen on
three dozen lots. Discount of \$1 per
dozen on five dozen lots.

Tacks Brads, &c.—
List Jan. 15, '99.
Carpet Tacks, American.....
90¢25¢5¢
American Cut Tacks.....90¢20¢5¢
Swedes Iron Tacks.....90¢20¢5¢
Swedes Upholsterers' Tacks.....
90¢15¢10¢5¢
Gimp Tacks.....90¢15¢5¢
Lace Tacks.....90¢10¢
Trimmers' Tacks.....90¢30¢10¢5¢
Looking Glass Tacks.....70¢10¢
Bill Posters' and Railroad Tack.....
90¢15¢5¢
Hungarian Nails.....80¢70¢5¢
Common and Patent Brads.....80¢10¢
Trunk and Clout Nails.....80¢5¢
NOTE.—The above prices are for
straight weights. An extra 5% is given
Star Weight and an extra 10¢-5% on
Standard Weights.

Miscellaneous—
Double Point Tacks.....90 and 5 tens
Steel Wire Brads, R. & E. Mfg.
Co.'s list.....50¢10¢60¢
See also Nails, Wire.

Tanks, Oil—
Emerald, S. S. & Co.....80-gal. \$3.40
Emerald, S. S. & Co.....60-gal. \$4.25
Queen City S. S. & Co., 80-gal.....\$3.50
Queen City S. S. & Co., 60-gal.....\$4.50

Tapes, Measuring—
American Asses' Skin.....40¢10¢50¢
Patent Leather.....25¢30¢5¢
Steel.....10¢10¢5¢
Chesterman's.....25¢5¢5¢
Keuffel & Esser Co., Steel and Metallic,
Lower list, 1899.....35¢
Larkin's Steel.....33¢45¢
Larkin's Metallic.....30¢30¢5¢

Teeth Harrow—
Steel Harrow Teeth, plain or headed,
3/4 inch and larger, per 100 lbs.....\$3.00

Thermometers—
Tin Case.....80¢10¢@80¢10¢5¢

Ties, Bale—Steel Wire.
Single Loop.....80¢@80¢10¢
Improved, Monitor, Cross Head,
Etc.....70¢

Ties, Wall—
Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 6 1/4 in. per 1000.....\$10.00
Galv. Steel 5-32 x 8 1/4 in. per 1000.....\$11.00
Galv. Steel 5-32 x 1 1/4 in. per 1000.....\$12.00
Galv. Steel 5-32 x 1 1/2 in. per 1000.....\$14.00

Tinners' Shears, &c.—
See Shears, Tinners', &c.

Tinware
Stamped, Japanned and Pieced, sold
very generally at net prices.

Tips, Safety Pole—
Covert's Saddlery Works.....60¢10¢
Tire Benders, Upsetters,
&c.—See Benders and Upset-
ters, Tire.

Tools—Coopers'—
L. & I. J. White.....20¢20¢5¢

Myers' Hay Tools.....50¢

Saw—
Atkins' Cross Cut Saw Tools.....40¢
Simonds' Improved.....33¢45¢
Simonds' Crescent.....25¢

Ship—
L. & I. J. White.....25¢

Transom Lifters—
See Lifters, Transom.

Traps—Fly—
Ballou, Globe or Acme.....
doz. \$1.15@1.25; gro. \$11.50@12.00
Harper, Champion or Paragon.....
doz. \$1.25@1.40; gro. \$13.00@13.50

Game—
Oneida Pattern.....80¢@90¢5¢
Newhouse.....45¢45¢5¢
Hawley & Norton.....65¢5&85¢10¢
Victor (Oneida Pattern).....75¢75¢5¢
Star (Blake Pattern).....60¢5&60¢10¢

Mouse and Rat—
Mouse, Wood, Choker, doz. holes.....
8 1/2¢@9¢
Mouse, Round or Square Wire.....
doz. 85¢90¢
Marty French Rat and Mouse Traps
(Genuine).....
No. 1, Rat, Each \$1.12 1/2; per doz. \$12.00

No. 3, Rat, per doz. \$6.00; case of 50
doz. \$5.25 doz.
No. 3 1/2, Rat, per doz. \$4.75; case of 50
doz. \$4.25 doz.
No. 4, Mouse, per doz. \$3.50; case of 7
doz. \$3.75 doz.
No. 5, Mouse, per doz. \$2.75; case of 150
doz. \$2.25

Schuyler's Ras Killer, No. 1, per gr. \$30.00
No. 2, per gr. \$30.00; Mouse, No. 3,
\$18.00.....50¢
J. M. Mast Mfg. Co.:
Mouse.....Rat
Blizzard.....No. 12, \$3.00 No. 1, \$9.50
Old Nick.....No. 30, 2.22 No. 2, 5.40
Joker.....No. 5, 2.10 No. 3, 5.40
Imp'd Snap Shot, Mouse, per gro., 2
hole, \$2.40
Imp'd Snap Shot, Mouse, per gro., 4
hole, \$4.20

Trimmers Spoke—
Bonney's Nos. 1 and 2.....40¢
Wood's F.I.....50¢

Trowels—
Diston Brick and Pointing.....30¢
Diston Plastering.....25¢
Diston "Standard Brand" and Gar-
den Trowels.....35¢
Kohler's Steel Garden Trowels, 5 in.....
per gro. \$5.00
Kohler's Steel Garden Trowels, 6 in.....
per gro. \$6.00
Never-Break Steel Garden Trowels.....
per gro. \$4.00
Peace's Plastering.....30¢
Rose Brick and Plastering.....25¢5¢
Woodrough & McFarlin, Plastering.....25¢

Trucks, Warehouse, &c.—
B. & L. Block Co.:
New York Pattern.....50¢10¢
Western Pattern.....60¢10¢
Handy Trucks.....per doz. \$16.00
Grocery.....per doz. \$15.00
Daisy Stove Trucks, Improved pattern.....
per doz. \$18.50
Model Stove Trucks.....per doz. \$18.50

Tubs, Wash—
No. 1 2 3
Galvanized, per doz. \$4.75 \$4.50 \$4.00
Galvanized Wash Tubs (S. S. & Co.):
No. 1 2 3 10 20 30
Per doz. \$5.25 \$5.00 \$4.75 \$4.50 \$4.00 \$3.00

Twine—Miscellaneous—
Flax Twine.....BC B.
No. 9, 1/4 and 1/2 lb. Balls 21¢4¢ 25¢4¢
No. 12, 1/4 and 1/2 lb. Balls 17¢4¢ 19¢4¢
No. 18, 1/4 and 1/2 lb. Balls 15¢4¢ 17¢4¢
No. 24, 1/4 and 1/2 lb. Balls 15¢ c 17 c
No. 36, 1/4 and 1/2 lb. Balls 15¢4¢ 16¢4¢
Chalk Line, Cotton, 1/4-lb. Balls.....
22¢@23¢4¢

Cotton Mops, 6, 9, 13 and 15 lb. to
doz.....80¢
Cotton Wrapping 5 Balls to lb.....
according to quality.....11¢@17¢
American 2-Ply Hemp, 1/4 and 1/2 lb.
Balls.....15¢11¢
American 3-Ply Hemp, 1-lb. Balls.....
19¢11¢

India 2-Ply Hemp, 1/4 and 1/2 lb.
Balls (Spring Twine).....8¢
India 2-Ply Hemp, 1-lb. Balls.....8¢
India 3-Ply Hemp, 1/4-lb. Balls.....7¢
2, 3, 4 and 5-Ply Jute, 1/2-lb. Balls.....
5¢8¢

Mason Line, Linen, 1/4-lb. Balls.....45¢
No. 264 Mattress, 1/4 and 3/4-lb. Balls.....
7¢
Wool, 3 to 6 ply.....50¢5¢4¢

Vises—
Solid Box.....50¢10¢5¢60¢5¢
Parallel—
Athol Machine Co.:
Simpson's Adjustable.....40¢
Standard.....40¢
Amateur.....25¢
Bonney's.....40¢
Columbian Hdw. Co.....40¢
Emmert Universal:
Pattern Makers' No. 1.....\$15.00 net.
Pattern Makers' No. 2.....\$13.00 net.
Machinist and Tool Makers'.....\$15.00 net.
Fisher & Norris Double Screw.....\$15.00
Holland's:
Machinists'.....40¢
Kev-Tone.....65¢5¢
Lewis Tool Co.....20¢30¢
Merrill's.....20¢
Miller's Falls.....50¢10¢10¢
Parker's:
Victor.....20¢25¢
Regulars.....20¢25¢
Vulcan's.....40¢45¢
Combination Pipe.....55¢60¢
Prentiss.....20¢25¢
Sargent's.....40¢
Smith & Hemenway Co.:
Machinists'.....40¢
Jewellers.....33¢
Snediker's X. L.....33¢
Stephens'.....33¢

Saw Filers'—
Bonney's, No. 1, \$13; No. 3, \$16.....50¢5¢
Diston's D 3 Clamp and Guide, per doz.
\$30.....25¢
Reading.....60¢
Wentworth's Rubber Jaw, Nos. 1, 2
and 3.....45¢50¢

Wood Workers'—
Wyman & Gordon's Quick Action, 6
in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe
Pipe.....80¢
Parker's Combination Pipe:
87 Series.....60¢
187 Series.....60¢5¢
No. 870.....40¢

Wads—Price Per M.
B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....\$1.00
P. E., 9 and 10.....1.25
P. E., 8.....1.50
P. E., 7.....1.50
Ely's B. E., 11 and larger.....\$1.00@1.75
Ely's P. E., 12 to 30.....\$3.00@3.45

Dist. 105

CURRENT METAL PRICES.

APRIL 1, 1903.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—
Bar Iron from Store—

Refined Iron	
1 to 1 1/2 in. round and square	2.15@2.30c
1 1/2 to 4 in. x 3/4 to 1 in.	2.20@2.30c
1 1/2 to 4 in. x 1/2 to 5/8 in.	2.40@2.50c
Rods—3/4 and 1-1/2 round and square	2.40@2.50c
Angles:	
3 in. x 3/4 in. and larger	2.45c
3 in. x 3/4 in. and 1/2 in.	2.60c
3 in. x 3/4 in. and 1/2 in.	2.45c
1 1/2 to 2 1/2 in. x 3/4 in.	2.50c
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	2.45c
1 to 1 1/2 in. x 3/4 in.	2.45c
1 to 1 1/2 in. x 3/4 in.	2.15c
3/4 x 3/4 in.	2.60c
3/4 x 3/4 in.	3.60c
3/4 x 3/4 in.	4.10c
Tees:	
1 in.	2.55c
1 1/2 in.	2.75c
1 1/2 in. and larger	2.65c
Beams:	
Channel, 3 in. and larger	2.50@3.00c
Bands—1 1/2 to 6 x 3/4 to No. 8	2.50c
"Burden's Best" Iron, base price	3.10c
Burden's "H. B. & S. Iron, base price	3.10c
"Uster"	3.15c
Norway Bars	3.75@4.25c
Norway Shapes	4.00@4.50c

Merchant Steel from Store—

Bessemer Machinery	2.10 to 2.20c
Toe Calk, Tire and Sleigh Shoe	2.30@3.00c
Best Cast Steel, base price in small lots	7c

Soft Steel Sheets—

1/4 inch	2.50c	No. 14	2.80c
3/16 inch	2.60c	No. 16	2.90c
No. 8	2.40c	No. 18	3.10c
No. 10	2.60c	No. 20	3.10c
No. 12	2.70c	No. 22	3.20c

Sheet Iron from Store.

Black.

One Pass, C. R.	G. R.
Soft Steel	Cleaned
Nos. 14 to 16	2.30c
Nos. 18 to 20	3.00c
Nos. 22 to 24	3.20c
Nos. 26 and 28	3.30c
No. 27	3.40c
No. 28	3.40c
No. 29	3.50c

Russia, Planished, &c.

Genuine Russia, according to assortment	1 1/2@1 1/4c
Patent Planished	1 1/2@1 1/4c

Galvanized.

Nos. 14 to 16	3.24c
Nos. 18 to 20	3.51c
Nos. 22 to 24	3.78c
No. 26	4.05c
No. 27	4.32c
No. 28	4.59c
No. 30	5.67c

Foreign Steel from Store—

Best Cast	2.15c
Extra Cast	2.15c
Swaged, Cast	2.15c
Best Double Shear	2.15c
Bilster, 1st quality	2.15c
German Steel, Best	2.15c
2d quality	2.15c
3d quality	2.15c
Sheet Cast Steel, 1st quality	2.15c
2d quality	2.15c
3d quality	2.15c
R. Musher's "Special"	2.15c
Annealed	2.15c
"Titanic"	2.15c
Josson's Choice XX Extra Best	2.15c
Josson Self Hardening	2.15c
Seamless "Nelson" Steel	2.15c
Hobson's "Soho" Special Self-Hardening	2.15c

METALS—

Tin—

Duty:—Pigs, Bars and Block. Free.	Per lb
Banca, Pigs	31 1/2@32c
Straita, Pigs	31 1/2@32c
Straita in Bars	31 1/2@32c

Tin Plates—

American Charcoal Plates.

Calland grade:	
IX, 14 x 20	8.25
Melny grade:	
IX, 14 x 20	6.50
IX, 14 x 20	7.75
Alway grade:	
IX, 14 x 20	5.50
IX, 14 x 20	6.80

American Coke Plates—Bessemer—

IX, 14 x 20	108c
IX, 14 x 20	8.70@8.85
IX, 14 x 20	9.00@9.25

American Terne Plates—

IX, 20 x 28	9.50
IX, 20 x 28	8.15@8.50

Copper—

Duty: Pig Bar and 1st quality and Old Copper free, Manufactured, 2 1/2% of 10.

Ingot—

Lake	15 1/2@15 3/4c
Casting	15 1/2@15 3/4c

Sheet and Bolt—

March 12, 1903.

Net.

Prices, in cents per pound.

Sheet 36 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, full sheet, 36 x 60 and heavier.	36 oz. to 64 oz. 35 to 50 lb.	24 oz. to 35 oz. 18½ to 25 lb.	16 oz. to 24 oz. 12½ to 18 lb.	14 oz. and 15 oz. 11 to 12½ lb.	12 oz. and 13 oz. 9½ to 11 lb.	10 oz. and 11 oz. 7½ to 9 lb.	8 oz. and 9 oz. 6½ to 7½ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
30	72	72	30	90	20	20	21	22	23	24	25
30	96	72	30	20	20	21	22	23	24	25	26
30	120	72	30	20	20	21	22	23	24	25	26
36	72	72	30	20	20	21	22	23	24	25	26
36	96	72	30	20	20	21	22	23	24	25	26
36	120	72	30	20	20	21	22	23	24	25	26
48	72	72	30	20	20	21	22	23	24	25	26
48	96	72	30	20	20	21	22	23	24	25	26
48	120	72	30	20	20	21	22	23	24	25	26
60	72	72	30	20	20	21	22	23	24	25	26
60	96	72	30	20	20	21	22	23	24	25	26
60	120	72	30	20	20	21	22	23	24	25	26
72	72	72	30	20	20	21	22	23	24	25	26
72	96	72	30	20	20	21	22	23	24	25	26
72	120	72	30	20	20	21	22	23	24	25	26
108	96	72	30	20	20	21	22	23	24	25	26
108	120	72	30	20	20	21	22	23	24	25	26
108	144	72	30	20	20	21	22	23	24	25	26
108	168	72	30	20	20	21	22	23	24	25	26
108	192	72	30	20	20	21	22	23	24	25	26
108	216	72	30	20	20	21	22	23	24	25	26
108	240	72	30	20	20	21	22	23	24	25	26
108	264	72	30	20	20	21	22	23	24	25	26
108	288	72	30	20	20	21	22	23	24	25	26
108	312	72	30	20	20	21	22	23	24	25	26
108	336	72	30	20	20	21	22	23	24	25	26
108	360	72	30	20	20	21	22	23	24	25	26
108	384	72	30	20	20	21	22	23	24	25	26
108	408	72	30	20	20	21	22	23	24	25	26
108	432	72	30	20	20	21	22	23	24	25	26
108	456	72	30	20	20	21	22	23	24	25	26
108	480	72	30	20	20	21	22	23	24	25	26
108	504	72	30	20	20	21	22	23	24	25	26
108	528	72	30	20	20	21	22	23	24	25	26
108	552	72	30	20	20	21	22	23	24	25	26
108	576	72	30	20	20	21	22	23	24	25	26
108	600	72	30	20	20	21	22	23	24	25	26
108	624	72	30	20	20	21	22	23	24	25	26
108	648	72	30	20	20	21	22	23	24	25	26
108	672	72	30	20	20	21	22	23	24	25	26
108	696	72	30	20	20	21	22	23	24	25	26
108	720	72	30	20	20	21	22	23	24	25	26
108	744	72	30	20	20	21	22	23	24	25	26
108	768	72	30	20	20	21	22	23	24	25	26
108	792	72	30	20	20	21	22	23	24	25	26
108	816	72	30	20	20	21	22	23	24	25	26
108	840	72	30	20	20	21	22	23	24	25	26
108	864	72	30	20	20	21	22	23	24	25	26
108	888	72	30	20	20	21	22	23	24	25	26
108	912	72	30	20	20	21	22	23	24	25	26
108	936	72	30	20	20	21	22	23	24	25	26
108	960	72	30	20	20	21	22	23	24	25	26
108	984	72	30	20	20	21	22	23	24	25	26
108	1008	72	30	20	20	21	22	23	24	25	26
108	1032	72	30	20	20	21	22	23	24	25	26
108	1056	72	30	20	20	21	22	23	24	25	26
108	1080	72	30	20	20	21	22	23	24	25	26
108	1104	72	30	20	20	21	22	23	24	25	26
108	1128	72	30	20	20	21	22	23	24	25	26
108	1152	72	30	20	20	21	22	23	24	25	26
108	1176	72	30	20	20	21	22	23	24	25	26
108	1200	72	30	20	20	21	22	23	24	25	26
108	1224	72	30	20	20	21	22	23	24	25	26
108	1248	72	30	20	20	21	22	23	24	25	26
108	1272	72	30	20	20	21	22	23	24	25	26
108	1296	72	30	20	20	21	22	23	24	25	26
108	1320	72	30	20	20	21	22	23	24	25	26
108	1344	72	30	20	20	21	22	23	24	25	26
108	1368	72	30	20	20	21	22	23	24	25	26
108	1392	72	30	20	20	21	22	23	24	25	26
108	1416	72	30	20	20	21	22	23	24	25	26
108	1440	72	30	20	20	21	22	23	24	25	26
108	1464	72	30	20	20	21	22	23	24	25	26
108	1488	72	30	20	20	21	22	23	24	25	26
108	1512	72	30	20	20	21	22	23	24	25	26
108	1536	72	30	20	20	21	22	23	24	25	26
108	1560	72	30	20	20	21	22	23	24	25	26
108	1584	72	30	20	20	21	22	23	24	25	26
108	1608	72	30	20	20	21	22	23	24	25	26
108	1632	72	30	20	20	21	22	23	24	25	26
108	1656	72	30	20	20	21	22	23	24	25	26
108	1680	72	30	20	20	21	22	23	24	25	26
108	1704	72	30	20	20	21	22	23	24	25	26
108	1728	72	30	20	20	21	22	23	24	25	26
108	1752	72	30	20	20	21	22	23	24	25	26
108	1776	72	30	20	20	21	22	23	24	25	26
108	1800	72	30	20	20	21	22	23	24	25	26
108	1824	72	30	20	20	21	22	23	24	25	26
108	1848	72	30	20	20	21	22	23	24	25	26
108	1872	72	30	20	20	21	22	23	24	25	26
108	1896	72	30	20	20	21	22	23	24	25	26
108	1920	72	30	20	20	21	22	23	24	25	26
108	1944	72	30	20	20	21	22	23	24	25	26
108	1968	72	30	20	20	21	22	23	24	25	26
108	1992	72	30	20	20	21	22	23	24	25	26
108	2016	72	30	20	20	21	22	23	24	25	26
108	2040	72	30	20	20	21	22	23	24	25	26
108	2064	72	30	20	20	21	22	23	24	25	26
108	2088	72	30	20	20	21	22	23	24	25	26
108	2112	72	30	20	20	21	22	23	24	25	26
108	2136	72	30	20	20	21	22	23	24	25	26
108	2160	72	30	20	20	21	22	23	24	25	26
108	2184	72	30	20	20	21	22	23	24	25	26
108	2208	72	30	20	20	21	22	23	24	25	26
108	2232	72	30	20	20	21	22	23	24	25	26
108	2256	72	30	20	20	21	22	23	24	25	26
108	2280	72	30	20	20	21	22	23	24	25	26
108	2304	72	30	20	20	21	22	23	24	25	26
108	2328	72	30	20	20	21	22	23	24	25	26
108	2352	72	30	20	20	21	22	23	24	25	26
108	2376	72	30	20	20	21	22	23	24	25	26
108	2400	72	30	20	20	21	22	23	24	25	26
108	2424	72	30	20	20	21	22	23	24	25	26
108	2448	72	30	20	20	21	22	23	24	25	26
108	2472	72	30	20	20	21	22	23	24	25	26
108	2496	72	30	20	20	21	22	23	24	25	26
108	2520	72	30	20	20	21	22	23	24	25	26
108	2544	72	30	20	20	21	22	23	24	25	26
108	2568	72	30	20	20	21	22	23	24	25	26
108	2592	72	30	20	20	21	22	23	24	25	26
108	2616	72	30	20	20	21	22	23	24	25	26
108	2640	72	30	20	20	21	22	23	24	25	26
108	2664	72	30	20	20	21	22	23	24	25	26
108	2688	72	30	20	20	21	22	23	24	25	26
108	2712	72	30	20	20	21	22	23	24	25	26
108	2736	72	30	20	20	21	22	23	24	25	26
108	2760	72	30	20	20	21	22	23	24	25	26
108	2784	72	30	20	20	21	22	23	24	25	26
108	2808	72	30	20	20	21	22	23	24	25	26
108	2832	72	30	20	20	21	22	23	24	25	26
108	2856	72	30	20	20	21	22	23	24	25	26
108	2880	72	30	20	20	21	22	23	24	25	26
108	2904	72	30	20	20	21	22	23	24	25	26
108	2928	72	30	20	20	21					